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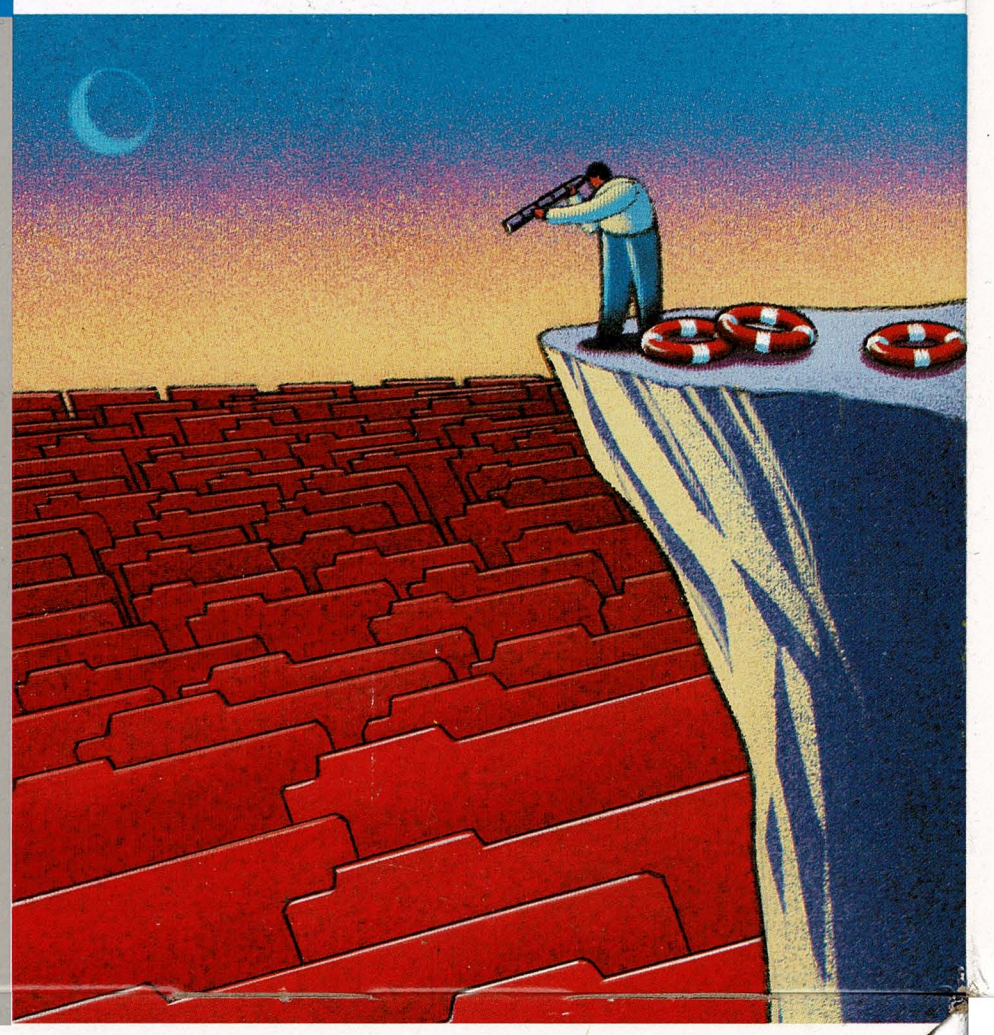

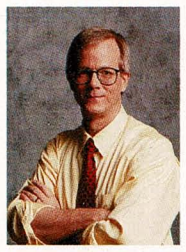

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PC Week, May 10, 1993

PC MAGAZINE EDITOR'S CHOICE
January 28, 1992

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The Award-Winning Standard for Data Recovery, Protection, and System Diagnostics

Version 7

User's Guide

Emergency Data Recovery Procedures

Before You Start

If you have an emergency situation and you've purchased Norton Utilities to restore your hard disk or recover deleted files, ***do not install the Norton Utilities on your hard disk.*** Any new files copied to your hard disk might overwrite existing files or data, preventing complete recovery. Follow the instructions below for emergency disk and data recovery.

These procedures give the basic steps to use UnFormat, UnErase, and Norton Disk Doctor from the Norton Utilities Emergency Disk. You can even start your computer with this disk, if necessary. For more detailed information about these programs, refer to the *Norton Utilities User's Guide.*

To UnFormat a Hard Disk

If you've accidentally formatted your hard disk, use the following procedure to recover your disk:

1. Insert the Norton Utilities Emergency Disk in the A: drive and restart your computer.

   The Norton Utilities emergency screen will appear.
2. Use the UpArrow and DownArrow keys to highlight UnFormat, then press Enter.
3. Read the introductory message, then press Enter to continue.
4. Use the UpArrow and DownArrow keys to highlight the drive you want to UnFormat, then press Enter.
5. Follow the UnFormat prompts to recover your hard disk automatically.

To Recover Erased Files

If you've accidentally erased valuable files, use the following procedure to recover the files:

1. Change to the directory from which your file was erased.
2. Insert the Norton Utilities Emergency Disk in the A: drive.
3. Type `A:UNERASE` at the DOS prompt, then press Enter.

   UnErase displays the name, size, date, time, and recovery prognosis for each erased file. Each filename begins with a question mark (?) because DOS overwrites the first letter of a filename when it erases a file.
4. Use the UpArrow and DownArrow keys to highlight the file you want to recover.

   Or,

   To select a file that is not displayed, press Alt+A to activate the UnErase File menu's VIEW ALL DIRECTORIES command. Highlight the file you want to recover. If the erased file is on a different drive, press Alt+D to select another disk drive.
5. Press U to select the UnErase command button.

   UnErase prompts you to enter a new first letter for the filename.
6. Enter a first letter for the filename and UnErase automatically recovers the file.

   The letter you enter does not have to be the original letter; any letter will do. You can rename the recovered file later.

If you've deleted a full directory of files and also removed the directory, first recover the directory with UnErase (it's the same procedure as recovering a file). Then you can recover the erased files.

If your computer will *not* start from your hard disk because you've deleted COMMAND.COM or the DOS system files, restart your computer with the Emergency Disk in the A: drive, use the UpArrow and DownArrow keys to highlight UnErase, then press Enter to start UnErase.

To Diagnose a Disk

If you have trouble accessing your hard disk, files or directories seem to be missing but were never deleted, or you cannot start your computer, use the following procedure to diagnose and correct disk problems:

1 If your computer will *not* start from your hard disk:

a Insert the Norton Utilities Emergency Disk in the A: drive and restart your computer.

The Norton Utilities emergency screen appears.

b Use the UpArrow and DownArrow keys to highlight Norton Disk Doctor, then press Enter.

The Norton Disk Doctor main menu appears with Diagnose Disk highlighted.

Or,

If your computer starts from your hard disk:

a Insert Norton Utilities Emergency Disk in the A: drive.

b Type `A:NDD` at the DOS prompt, then press Enter.

The Norton Disk Doctor main menu appears with Diagnose Disk highlighted.

2 Press Enter to select Diagnose Disk.

A list of available drives appears.

3 Use the UpArrow and DownArrow keys to highlight the drive to diagnose, then press Enter.

Norton Disk Doctor begins its suite of disk tests.

4 If Norton Disk Doctor finds any errors, follow the screen prompts to correct them automatically.

Make sure you have a blank, formatted floppy disk available so Norton Disk Doctor can create an UnDo file—just in case the corrections made are not what you expected.

Other Recovery Options

The Disk Editor and Disk Tools utilities are also available on the Emergency Disk. If your problem is missing or corrupted DOS system files, you can use Disk Tools to make your disk bootable. See Chapter 11 of the *Norton Utilities User's Guide* for instructions on using Disk Tools. Use Disk Editor to access all system and data areas on your disk. See Chapter 9 and Appendix B of the *Norton Utilities User's Guide* for recovery procedures using Disk Editor.

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Norton Utilities User's Guide

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The Norton Utilities

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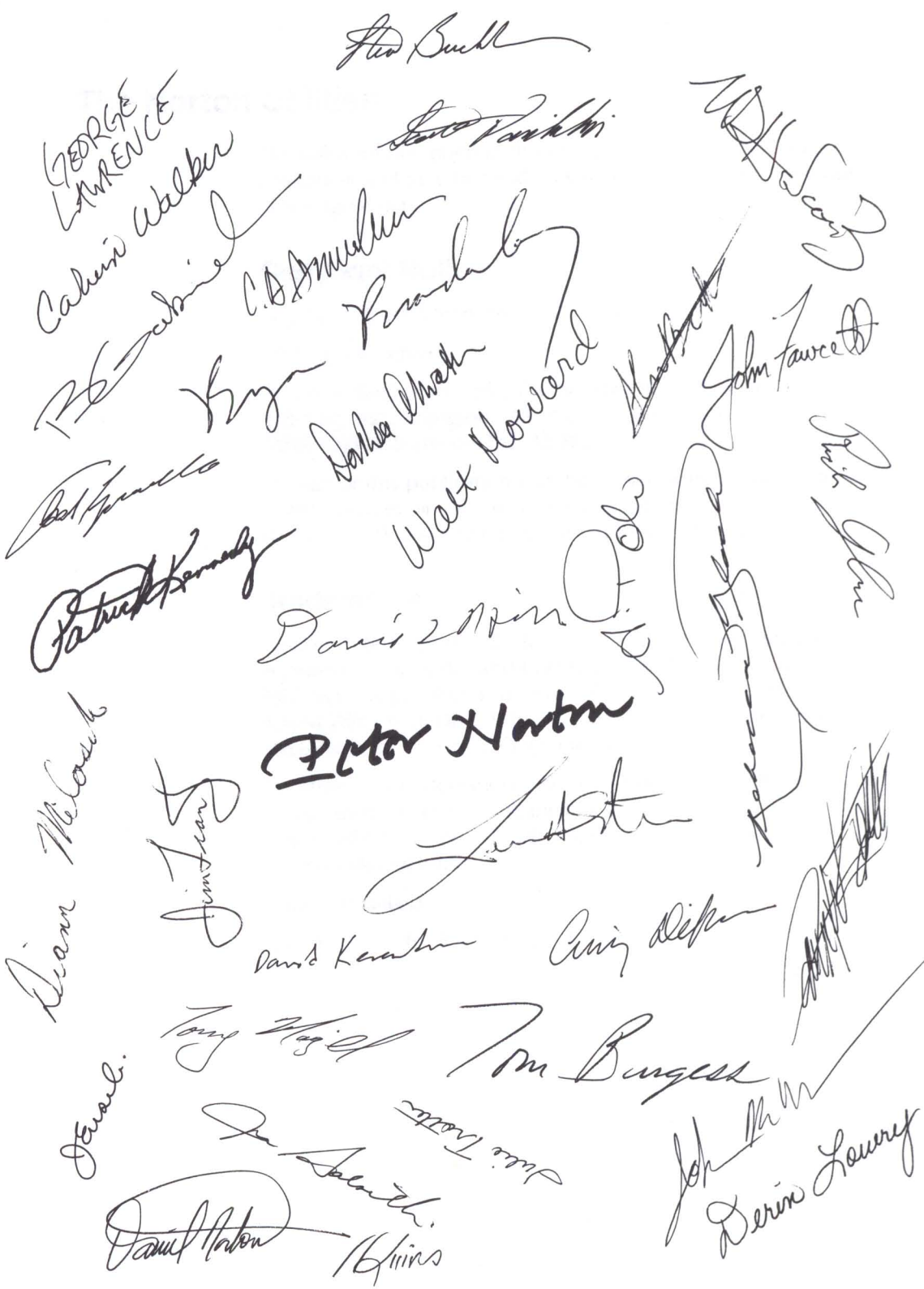
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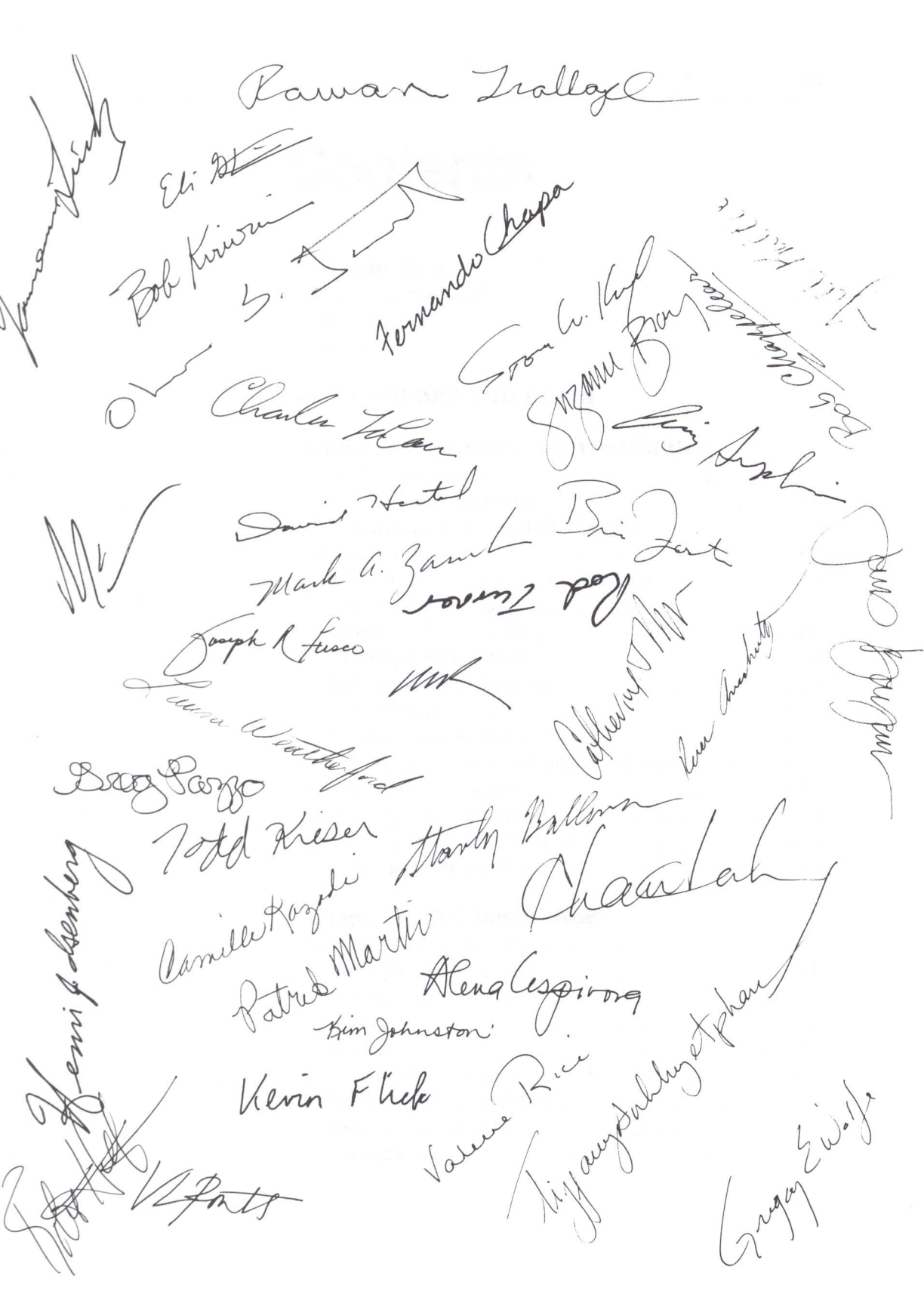

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Introduction

Welcome to the Norton Utilities.

This manual provides both instructional and reference material to help you get the most from the Norton Utilities. Use it now to learn the basics of the Norton Utilities and later as a reference to perform specific tasks.

This manual assumes that you are using a keyboard to interact with the Norton Utilities. Norton Utilities also provides mouse support. See Chapter 2, "Getting Started," for navigation instructions for both the keyboard and mouse.

Documentation Road Map

Norton Utilities provides documentation in two forms: a printed user's guide and several online documents. The following two sections describe the information contained in each document.

User's Guide

The *Norton Utilities User's Guide* describes how to use the Norton Utilities. It consists of the following parts:

- Emergency Procedures foldout—Provides step-by-step instructions for recovering data or performing disk repairs in an emergency.
- Part 1: Before You Begin—Provides an overview of the documentation and instructions for installing Norton Utilities.
- Part 2: Tutorials—Provides step-by-step instructions on the most commonly used utilities.
- Part 3: Reference—Describes each utility. The descriptions are arranged alphabetically.
- Part 4: Appendixes—Provides background information on disks, disk troubleshooting procedures, and complete information for using Norton Utilities and NDOS commands from the DOS command line.

Online Documentation

Norton Utilities includes the following online documentation:

Help	An extensive online Help system. For details on getting help, see Chapter 2, "Getting Started," in this user's guide.
NDOS User's Guide and Reference	Describes how to use the NDOS command processor.
WHATS.NEW File	Describes the new features in this version of Norton Utilities. For instructions on viewing the WHATS.NEW file, see the "Reading the WHATS.NEW File" section later in this chapter.
READ.ME File	Contains information that became available too late to include in the printed manual. For instructions on viewing the READ.ME file, see the "Reading the READ.ME File" section later in this chapter.

Reading the WHATS.NEW File

To view the WHATS.NEW file on your screen before installing the Norton Utilities, insert the Installation Disk into a floppy disk drive, switch to that drive, and enter `more < whats.new` at the DOS prompt.

To view the WHATS.NEW file after installation, switch to the directory where you installed the Norton Utilities and enter `more < whats.new` at the DOS prompt.

Reading the READ.ME File

To view the READ.ME file on your screen before installing the Norton Utilities, insert the Installation Disk into a floppy disk drive, switch to that drive, and enter `more < read.me` at the DOS prompt.

To view the READ.ME file after installation, switch to the directory where you installed the Norton Utilities and enter `more < read.me` at the DOS prompt.

To print the READ.ME file from the distribution floppy disks or from the Norton Utilities directory on your hard disk, switch to the proper drive and directory and enter `copy read.me prn` at the DOS prompt. You can also import the READ.ME file into your word processor.

Definitions

The Norton Utilities documentation uses the following standard definitions:

drive	The letter designating a hard disk or floppy disk. In almost all cases, a colon (:) must follow the drive letter.
path	The directory location. A single backslash (\) means the root directory, a single dot (.) means the current directory, and double dots (..) mean the parent directory.
filename	The name of a file, including any filename extension. You can use the wildcard characters (* and ?) with most filenames.
pathname	The drive, path, and filename for a file. For most programs and commands, the default drive is assumed if you omit the drive. If you omit the directory, the current directory is assumed.
parameter	Additional information for a command. Parameters that you replace with your own information appear in lowercase. Keyword parameters appear in uppercase, but you can enter them in uppercase or lowercase.
string	A series of characters.

/switch	A command line control option. A switch consists of a forward slash followed by the switch characters. You must enter the forward slash unless you have changed the DOS switch character.

Conventions

To help you find information, the Norton Utilities documentation adheres to the following conventions.

Symbols

Symbol	Meaning
■	Indicates an item in a list or the step in a single-step procedure.
	Indicates a note of interest.
	Indicates a tip or helpful hint.
	Indicates a cautionary note; pay special attention.
	Indicates a warning; read it carefully.

Type Styles

Style	Meaning
SMALL CAPS	Indicates the name of a menu command, such as EXIT.
Initial Caps	Indicates the name of an object, such as a menu, command button, dialog box, or dialog box component. For example, the File menu or the Cancel command button.

ALL CAPS	Indicates a word that you enter as shown, such as the name of a path, directory, file, command, or switch.
lowercase	Indicates parameters that you replace with your own entry, such as the name of a file.
`monospaced`	Indicates something you should enter from the keyboard. For example, "Type `*.DOC` to search for all documents."
[ ]	Indicates an optional parameter or switch. Do not enter the brackets themselves.
|	Indicates that you can use only one of the options separated by this vertical bar.
...	Indicates that you can repeat the preceding option as many times as necessary.
space	Indicates separate elements when used for command line syntax. Otherwise, touching elements might confuse the syntax.

PART

I

Before You Begin

This part of the *Norton Utilities User's Guide* contains the following chapters:

- Chapter 1, "Installing Norton Utilities," describes how to install Norton Utilities.
- Chapter 2, "Getting Started," provides an overview of the Norton Utilities, navigation instructions for the keyboard and mouse, instructions on running the Norton program, and instructions on getting help.

CHAPTER

1 Installing Norton Utilities

This chapter explains how to install Norton Utilities on your hard disk.

CAUTION: If you have an emergency and need to recover deleted files, unformat a disk, or perform disk repairs, or you have some other problem with your hard drive, read the Emergency Recovery Procedures foldout on the inside front cover before installing Norton Utilities. The emergency instructions guide you through the procedures you perform using the Emergency Disk.

System Requirements

Norton Utilities version 7 requires the following:

- IBM PC AT, PS/2, or 100% compatible computer
- DOS 3.3 or later
- 640K memory (1 MB recommended)
- A hard disk drive (the amount of disk space required is reported on the screen from which you select an installation method)

The installation program automatically checks whether you have enough available hard disk space to install the program files. With a custom installation, you can only install some of the files if you don't have enough space for a full installation.

Although a mouse is not required, Norton Utilities provides mouse support.

About the Installation Program

The installation program copies the Norton Utilities from the distribution floppy disks to the directory you specify. You can modify your CONFIG.SYS and AUTOEXEC.BAT files, choose which programs to run at startup, and configure your computer to best use the Norton Utilities. Additionally, you can create a rescue disk, which is a bootable floppy disk for recovery if you ever lose access to your hard disk.

You can perform a full or custom installation. This chapter includes descriptions and instructions for both procedures.

In almost every dialog box you can quit the installation (using the Return to DOS command button) before installing any programs. Your last chance to quit is the dialog box where you specify a directory for the Norton Utilities programs (or the dialog box that prompts you to delete old Norton Utilities files if you have a previous version of Norton Utilities).

NOTE: Except for the emergency and rescue disks, the Norton Utilities are designed to run from a hard disk. Also, you must use this Install program to put them on your hard disk before you can use them. You cannot just copy executable files from the distribution disks and expect them to run. Even after installing them on your hard disk, it is not recommeded to copy executable files to a floppy disk and run them because the utilities use various configuration files and a run-time library during execution.

Navigating in the Installation Program

To select items on an Install dialog box with the keyboard, use the arrow keys. Press Tab to move the selection bar or cursor to the item you want. To select an item, press Spacebar or Enter. To select an item on the dialog box with the mouse, click it. See "Using the Keyboard and Mouse" in Chapter 2, "Getting Started," for more information on navigation techniques.

Starting the Installation

This section walks you through each dialog box for installing Norton Utilities (upgrading uses the same procedure).

NOTE: Before beginning the installation, you should have a blank floppy disk available so that Norton Utilities can create your unique rescue disk during the last part of the installation. To get the most recovery programs on your rescue disk, use the highest capacity disk that your floppy drive supports.

Whether you are using the 5 ¼-inch disks or the 3 ½-inch disks, start with the Installation Disk.

To install Norton Utilities:

1. Insert the Installation Disk into the A: or B: drive, then type:

   `a:install`

   (If you are using the B: drive, substitute `b:` for `a:`.)

   If you are installing Norton Utilities for the first time, the first dialog box prompts you to choose the display colors appropriate for your monitor.

2. Select the appropriate display colors.

   A warning message appears stating that you should not install Norton Utilities on your hard disk if it currently contains erased files that you want to recover, or if you need to unformat the hard disk. If you have an emergency, see the Emergency Recovery Procedures foldout for instructions on using the Norton Utilities Emergency Disk to recover files or unformat your disk.

3. Select Continue to continue installation.

   A dialog box appears describing what the Install program does, your options for configuring your system, and general navigation options.

4. Select Continue to continue installation.

   A dialog box appears where you can personalize your copy of Norton Utilities.

5 Enter your name and (optionally) your company name and select OK.

The next dialog box presents the two types of Norton Utilities installations.

Full Install: Select to install all the utilities and set the default configuration. This method is faster and easier than a custom installation.

Custom Install: Select to decide which programs to install, which to run at startup, and other configuration options. This installation contains two more dialog boxes than the full installation; they appear after you choose a location for the program files. Use this method to install NDOS.

Return to DOS: Select to quit the installation process without installing.

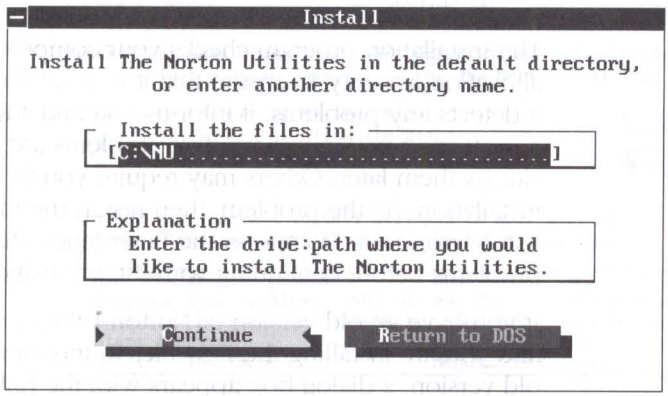
6 Select Full Install or Custom Install.

Choosing the Norton Utilities Directory

Next, you specify where you want to place the Norton Utilities files. If you have an NU environment variable or the Norton Utilities directory in your PATH statement indicating an old version of the Norton Utilities, the destination directory defaults to the directory of the old version. You can specify a new directory instead of using the old one.

If you do not have a previous version of Norton Utilities, the installation program defaults to C:\NU as the directory for the Norton Utilities (see Figure 1-1).

Figure 1-1 Specify a directory to install the Norton Utilities files



To select a directory for the Norton Utilities:

- Select the Continue command button to accept the default directory.

Or,

- Type a new directory name and select Continue.

NOTE: If you are performing a custom installation, skip to the "Custom Installation" section later in this chapter for instructions on completing the next two dialog boxes.

Transferring the Files

After you select a directory for Norton Utilities, Install begins transferring the files from the floppy disks to your hard disk. If you don't have enough space on your hard disk for the files, Install displays a message. In this case, you have three options:

- Choose another drive.
- Run Install again using the Custom Install method to copy only those program files for which you have room on your hard disk.

- Quit the installation program and make room on your hard disk.

The installation program checks your computer's hard disk for allocation integrity to ensure that it is in satisfactory condition. If it detects any problems, it informs you and suggests a solution in a message box. Some hard disk problems are minor and you can fix them later. Others may require you to halt the installation, fix the problem, then restart the installation. You can use Norton Disk Doctor on the Emergency Disk to fix these problems before continuing with the installation.

If you have an old version of Norton Utilities on your hard disk and you are installing the new files in the same directory as the old version, a dialog box appears with the following options.

Delete: Erase all the existing Norton Utilities files.

Skip: Do not erase any Norton Utilities files. However, any of the old files with the same name as the new files are replaced. Use this option if you are running Install again to perform a partial (custom) installation.

Return to DOS: Exit Install before making any changes or copying any files to your hard disk. This is your last chance to quit before copying the files.

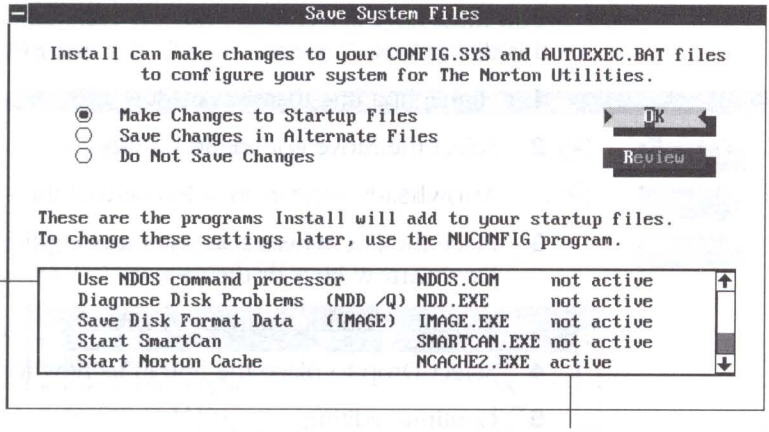
To continue the installation:

- Select Delete or Skip.

Modifying Your Startup Files

If you selected the Full Install method or a Custom Install with selections that changed a startup file (AUTOEXEC.BAT or CONFIG.SYS), a dialog box displays options for saving the changed startup files (see Figure 1-2).

Figure 1-2 Save System Files dialog box


Save System Files
Install can make changes to your CONFIG.SYS and AUTOEXEC.BAT files to configure your system for The Norton Utilities.
Make Changes to Startup Files
Save Changes in Alternate Files
Do Not Save Changes
OK
Review
These are the programs Install will add to your startup files.
To change these settings later, use the NUCONFIG program.
Use NDOS command processor NDOS.COM not active
Diagnose Disk Problems (NDD /Q) NDD.EXE not active
Save Disk Format Data (IMAGE) IMAGE.EXE not active
Start SmartCan SMARTCAN.EXE not active
Start Norton Cache NCACHE2.EXE active

Programs that Install can put in your startup files

Programs marked "active" are in your startup files or will be; programs marked "not active" are not in your startup files

To review changes in your startup files:

- Select Review.

  The Editing Startup files dialog box appears showing your AUTOEXEC.BAT file. Any lines that Install changed are highlighted or red.

  If you want to review (or edit as described below) your other startup file (CONFIG.SYS), highlight the File drop-down list box, press Ctrl+DownArrow to open it, and choose the file you want to edit.

To delete lines from your startup files:

You must have selected the Review command button to display this dialog box.

1. Highlight a line that you want to delete.
2. Select the Delete command button.

   The line disappears.
3. Continue editing.

   Or,

   Select OK to save your editing changes and exit this dialog box.

To move lines in your startup files:

You must have selected the Review command button to display this dialog box.

1. Highlight a line that you want to move.
2. Select the Move command button.

   Arrowheads appear on either side of the selected line.
3. Place the line where you want it using the UpArrow and DownArrow keys or the mouse.

   The Move button changes to Drop.
4. Select Drop to place the line in its new location.
5. Continue editing.

   Or,

   Select OK to save your editing changes and exit this dialog box.

To save the changes to your startup files:

- Select one of the following options then select OK.

  Make Changes to Startup Files: Make the changes shown in the list box to your startup files. Your original startup files are renamed CONFIG.NU7 and AUTOEXEC.NU7.

  Save Changes in Alternate Files: Make the changes to your startup files and save these changed files as CONFIG.TMP and AUTOEXEC.TMP. For these changes to take effect, you must later replace your startup files with these new files and restart your computer.

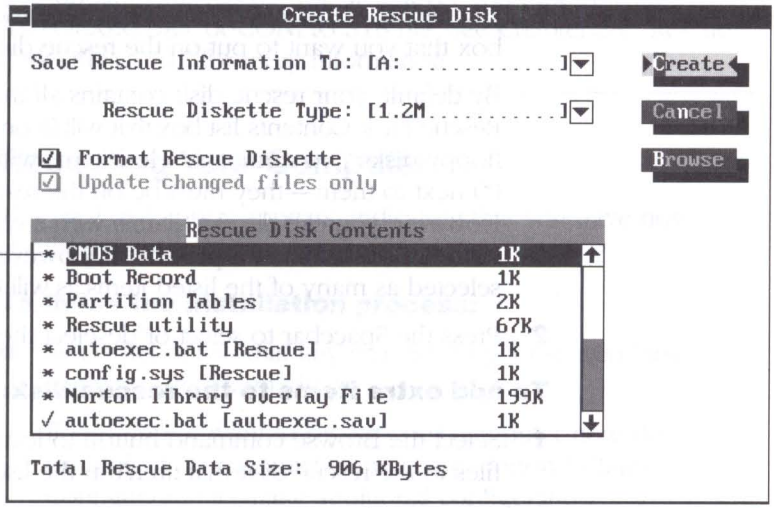
  Do Not Save Changes: Make no changes to your startup files. If you want to configure the Norton Utilities properly, you must manually make the changes that Install would have made or use Norton Utilities Configuration.

Creating a Rescue Disk

The dialog box shown in Figure 1-3 appears if you are performing a Full Install, or if you selected Create a Rescue Disk

After Install from the Select Configuration Options dialog box during a Custom Install.

Figure 1-3 Create Rescue Disk dialog box



Utilities and files that go onto your rescue disk

To choose a disk for your rescue disk:

1 Select the floppy disk drive for the rescue disk from the Save Rescue Information To drop-down list box.

If you choose another type of drive, a text box appears for you to type the directory for the rescue disk files. The directory must already exist.

CAUTION: Do not store rescue files on the disk that they are meant to rescue, because restoring system information from a damaged disk may not work.

2 Check that the correct disk type appears in the Rescue Disk Type drop-down list box.

3 If you do not want to format the floppy disk before copying rescue files to it, uncheck the Format Rescue Diskette check box.

If you leave this check box checked, the format permanently erases any data already on the disk, so use a blank disk. It also makes the disk bootable so you can

start your computer from it if you can no longer start your computer from the hard disk.

To select or deselect items for the rescue disk:

1. Highlight a file or utility in the Rescue Disk Contents list box that you want to put on the rescue disk.

   By default, your rescue disk contains all the items in the Rescue Disk Contents list box that will fit on the selected floppy disk. You cannot deselect items with an asterisk (*) next to them—they must be on the rescue disk. However, you can deselect items with a checkmark next to them. For maximum protection, however, leave selected as many of the listed items as will fit on the disk.

2. Press the Spacebar to select or deselect the item.

To add extra items to the rescue disk:

1. Select the Browse command button to locate and add files to the rescue disk that aren't in the list box.
2. Select the drive that you want to browse from the Drive drop-down list box.
3. Select the files you want to add.

   You can type a filename in the Files text box, specify another drive in the Drive drop-down list box, or select directories and files from the Directories and Files list boxes.

4. Select OK.

To create the rescue disk:

1. Select Create.

   If you left the Format Rescue Diskette check box checked, a message appears warning that any data on the disk will be lost. To go ahead with the format, select OK.

   A dialog box informs you when the rescue disk is finished.

2. Select OK.
3. If you used a floppy disk, remove it from the drive, label it "Rescue Disk," write-protect it, and store it in a safe place.

TIP: Update your rescue disk any time you change your computer's partition tables or logical drive assignments, or if you add a new device driver or compressed disk drive. You should also update your rescue disk whenever you modify your AUTOEXEC.BAT or CONFIG.SYS file. See Chapter 28, "Rescue Disk (RESCUE)," for more information.

Rebooting Your Computer

The final dialog box appears, indicating that you have now installed Norton Utilities on your hard disk.

To finish the installation process:

- Select Reboot so that any changes to your startup files can take effect immediately.

  If you do not want to reboot your computer now (for example, you may next want to run Norton Utilities Configuration to make additional configuration changes), you can choose one of the following command buttons:

  Go to Program: Exit Install and open the Norton Utilities main screen. Changes to your startup files remain unactivated until you reboot.

  Return to DOS: Exit Install and return to the DOS prompt. Changes to your startup files remain unactivated until you reboot.

Custom Installation

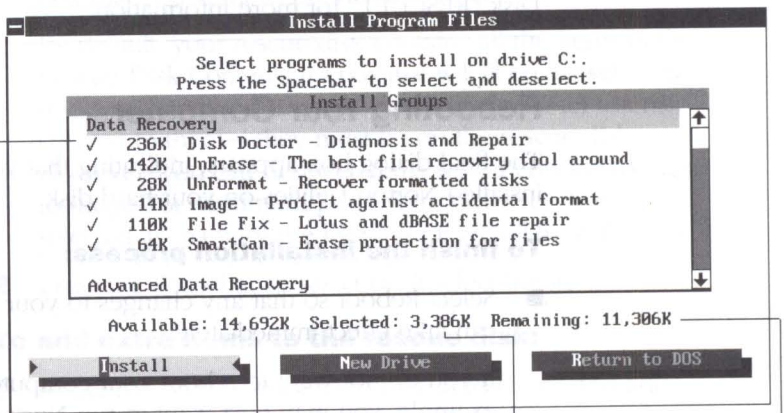
When you perform a Custom Install, you can select individual Norton Utilities programs to install and configure. These procedures are described in the following sections.

Selecting Norton Utilities Programs

If you are performing a custom installation, the dialog box in Figure 1-4 appears after you choose a location for the Norton Utilities.

When you select utilities or configuration items from the lists in these custom installation dialog boxes, a checkmark appears next to them. Items with an asterisk next to them must be installed.

Figure 1-4 Install Program Files dialog box


Install Program Files
Select programs to install on drive C:.
Press the Spacebar to select and deselect.
Install Groups
Data Recovery
✓ 236K Disk Doctor - Diagnosis and Repair
✓ 142K UnErase - The best file recovery tool around
✓ 28K UnFormat - Recover formatted disks
✓ 14K Image - Protect against accidental format
✓ 110K File Fix - Lotus and dBASE file repair
✓ 64K SmartCan - Erase protection for files
Advanced Data Recovery
Available: 14,692K Selected: 3,386K Remaining: 11,306K
Install
New Drive
Return to DOS

The utilities that the installation program installs

Current available disk space

Kilobytes of utilities selected to install

Disk space remaining after installation

To select which Norton Utilities programs to install:

1 Deselect groups or individual utilities that you do not want to install.

You can choose among the following groups, which contain from two to ten utilities:

- Data Recovery
- Advanced Data Recovery
- Speed Optimization
- Data Security
- Diagnostics and Configuration
- Command-Line Utilities
- NDOS
- Disk and File Management
- Windows Icons

By default, all the programs are selected (checked). You cannot deselect the Basic Files because you must have them to run Norton Utilities.

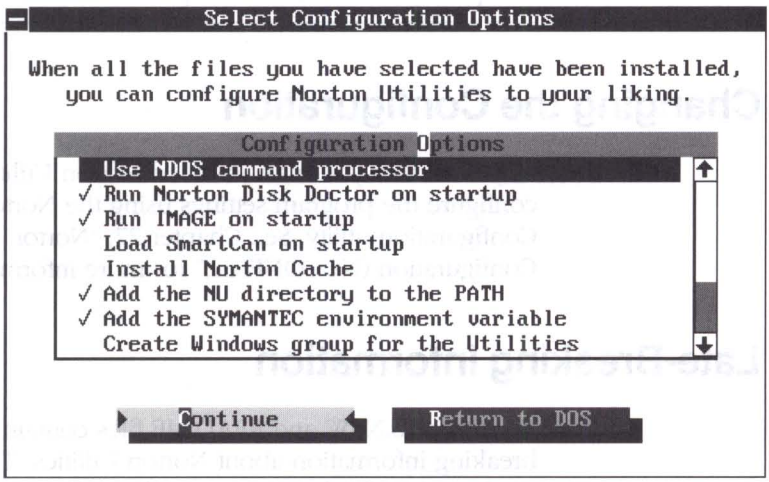
This dialog box also gives you a second chance to change your location for the Norton Utilities. Select the New Drive command button to specify a new location.

2 Select Install to continue.

Specifying Custom Configuration Options

After you specify the programs to install, the Select Configuration Options dialog box appears (Figure 1-5) where you configure your system for the Norton Utilities.

Figure 1-5 Select Configuration Options dialog box


Select Configuration Options
When all the files you have selected have been installed, you can configure Norton Utilities to your liking.
Configuration Options
Use NDOS command processor
✓ Run Norton Disk Doctor on startup
✓ Run IMAGE on startup
Load SmartCan on startup
Install Norton Cache
✓ Add the NU directory to the PATH
✓ Add the SYMANTEC environment variable
Create Windows group for the Utilities
Continue
Return to DOS

You can select or deselect any of the options in the Configuration Options list box except the Configure Norton Utilities option. This option makes the following changes:

- Creates a temporary directory for temporary files (if you do not already have one).
- Adds Norton Utilities help to the HELP.EXE file in recent DOS versions.
- Creates (or updates) the NORTON.CMD file, which is used by the NORTON.EXE program options.

To configure your installation:

1. Select or deselect options from the Configuration Options list box.
2. Select Continue to begin transferring the files from the floppy disks to your hard disk.

   The rest of the Custom Install process is the same as a Full Install. Continue the installation with "Transferring the Files" earlier in this chapter.

NOTE: If you don't create the Windows group for the utilities during installation, you can add it later from Windows. Start Windows, choose Run... from the File menu, and type `instdos.exe`. Or, you can run Install again using the Custom Install method and deselect all choices from this dialog box except Create Windows Group for the Utilities.

Changing the Configuration

Any time after you have installed Norton Utilities, you can configure the program settings using the Norton Utilities Configuration utility. See Chapter 27, "Norton Utilities Configuration (NUCONFIG)," for more information.

Late-Breaking Information

The WHATS.NEW and READ.ME files contain additional, late-breaking information about Norton Utilities. The following sections describe how to access those files.

Reading the WHATS.NEW File

To view the WHATS.NEW file on your screen before installing the Norton Utilities, insert the Installation Disk into a floppy disk drive, switch to that drive, and enter `more < whats.new` at the DOS prompt.

To view the WHATS.NEW file after installation, switch to the directory where you installed the Norton Utilities and enter `more < whats.new` at the DOS prompt.

Reading the READ.ME File

To view the READ.ME file on your screen before installing the Norton Utilities, insert the Installation Disk into a floppy disk drive, switch to that drive, and enter `more < read.me` at the DOS prompt.

To view the READ.ME file after installation, switch to the directory where you installed the Norton Utilities and enter `more < read.me` at the DOS prompt.

To print the READ.ME file from the distribution floppy disks or from the Norton Utilities directory on your hard disk, switch to the proper drive and directory and enter `copy read.me prn` at the DOS prompt. You can also import the READ.ME file into your word processor.

CHAPTER

2 Getting Started

This chapter provides the information you need to begin using Norton Utilities. In this chapter, you'll find:

- An overview of the Norton Utilities
- Instructions for navigating in Norton Utilities
- Instructions on using Norton Utilities dialog boxes
- Instructions for using the Norton program
- Instructions on getting help

Norton Utilities at a Glance

The Norton Utilities version 7 is the latest successor to Peter Norton's original PC utilities. The following sections list the programs included in the Norton Utilities. This version of Norton Utilities also contains many improvements and new features detailed in the WHATS.NEW file.

Recovery

- Norton Diagnostics—Tests your hardware and diagnoses problems.
- Norton Disk Doctor—Repairs most disk problems automatically.
- Disk Editor—Edits data at any location on your hard disk.
- Disk Tools—Provides tools to revive defective floppy disks, recover from the DOS RECOVER command, make a disk bootable, and mark clusters as good or bad.
- File Fix—Repairs corrupted dBASE, Clipper, Quattro Pro, Lotus 1-2-3, Symphony, Excel, and WordPerfect files.

- Image—Stores an image of a disk's "bookkeeping" area for complete recovery with UnFormat and UnErase.
- Rescue Disk—Makes and restores from a rescue disk.
- SmartCan—Protects deleted files from being overwritten for complete recovery.
- UnErase—Recovers deleted files.
- UnFormat—Recovers files after an accidental hard disk format or floppy disk Safe Format.

Security

- Disk Monitor—Provides write protection (from viruses, for example), parks disk read-write heads, and alerts you when drives are being accessed.
- Diskreet—Encrypts and decrypts files and provides password protection for confidential data.
- Wipe Information—Overwrites file contents so that they can never be recovered, and wipes slack area at the end of files.

Speed

- Calibrate—Performs low-level formatting, determines optimum disk interleave, and performs many system tests.
- Norton Cache—Accelerates program operation by keeping frequently accessed data in memory.
- Speed Disk—Unfragments and rearranges files on your hard disk for faster access.

Tools

- Batch Enhancer—Provides commands to expand batch file capabilities.
- Norton Utilities Configuration—Configures Norton Utilities for your system.

- Norton Control Center—Displays and modifies hardware settings including country-specific date and numeric formats.
- Directory Sort—Sorts files in directories for more convenient display and faster access.
- Duplicate Disk—Makes an exact duplicate of a floppy disk.
- File Attributes—Changes file attributes.
- File Date—Changes file date and time.
- File Find—Searches directories to find files (including hidden files) with flexible search criteria including dates, attributes, and, for network files, owner. Provides text search and replace across multiple files.
- File Locate—Finds any file quickly.
- File Size—Shows the exact size of files and percentage of disk space used.
- Line Print—Prints text files to any text or PostScript printer.
- Norton Change Directory—Provides a graphical interface to quickly maneuver among and manipulate directories.
- Safe Format—Formats disks without erasing existing data, and displays existing files on a floppy disk that's about to be formatted.
- System Information—Provides extensive reports on hardware, memory usage, and more.
- Text Search—Finds files containing specific text.

Command Processor

The NDOS command processor is an enhanced replacement for DOS COMMAND.COM, providing greater power and convenience at the command line while using less memory. In addition, the NDOS online Help provides convenient full-screen help for all NDOS commands, DOS commands, and Norton Utilities programs.

Using the Keyboard and Mouse

This section explains using the keyboard and the mouse to navigate and operate Norton Utilities. Norton Utilities is completely mouse-compatible.

When running Norton Utilities in full-screen mode, you usually use pull-down menus and dialog boxes to interact with the program.

Using the Keyboard

Global keyboard use within Norton Utilities is described below. For details on dialog box components, see "Using Dialog Boxes" later in this chapter.

Press this key:	**To perform this action:**
Enter	Execute the selected command button. Most dialog boxes have a default command button identified by a double border around it or "button arrows" on it.
Esc	Close a dialog box and cancel any changes made.
Arrow keys	Move to the closest component in the direction of the arrow.
Tab	Move to the next component or group box in the dialog box.
Shift+Tab	Move to the previous component or group box in the dialog box.
Home, PageUp	Move to first component in the dialog box.
End, PageDown	Move to last component in the dialog box.
Hot keys	Press and hold the Alt key, then press the contrasting letter in the command name to perform the action associated with that letter.

Using the Mouse

Global mouse use within Norton Utilities is described below.

Click:	To perform this action:
Either button	Select the dialog box component you're pointing to.
Right button	Select and launch the command you're pointing to.
Both buttons	Close a dialog box and cancel any changes made.

Using Pull-down Menus

Many utilities have a menu bar at the top line of the screen listing the pull-down menus currently available. This section describes how to use the keyboard and mouse to access the pull-down menus.

To use the keyboard to choose commands in a pull-down menu:

Press Alt or F10 to move to the menu bar, then press DownArrow to pull down the first menu. Use the LeftArrow and RightArrow keys to move among menus.

Press Alt and the contrasting letter of any menu to pull down that menu.

Use the UpArrow and DownArrow keys to move to the command you want and press Enter or press the hot key for the command you want. The hot key is the contrasting letter in the command name. Pressing that letter selects that menu item.

To cancel a menu without choosing a command, press Esc.

Most commands have keyboard shortcuts listed on the menu. You can use keyboard shortcuts when the menus are not open.

To use the mouse to choose commands in a pull-down menu:

Position the mouse cursor over the name of the menu you want and click either mouse button to pull down the menu. Click a command from the menu.

To cancel a menu without choosing a command, click anywhere outside the menu.

Using Dialog Boxes

A dialog box is any screen or panel that accepts input. This section describes using the different types of dialog box components—option buttons, check boxes, command buttons, text boxes, and list boxes.

Group boxes help organize related choices in a dialog box. Each group box contains a title describing how the choices are related. A group box can contain several types of dialog box components. They often contain option buttons and check boxes.

Using Option Buttons

You can select only one option button at a time, and one button is always selected. Choosing another button selects it and deselects the previously selected button.

Press:	To perform this action:
Arrow keys	Move the cursor to the next option button without changing the current setting.
Spacebar	Select an option button if the cursor is not on the currently selected option button. If the cursor is on the currently selected option button, pressing the Spacebar deselects the current button and selects the next one.
Hot key	Select an option button. The contrasting letter in the option button name is the hot key.
Mouse button	Move the cursor to the option button and select it.

Using Check Boxes

Check boxes are on-off switches. When checked, they are "on," when unchecked, they are "off."

Press:	To perform this action:
Spacebar	Toggle the current state of the check box.
Hot key	Move the cursor to the check box and toggle its current state.
Mouse button	Toggle the current state of the check box and move the cursor to it.

Using Command Buttons

Command buttons start or complete an action. Buttons inside dialog boxes can open other dialog boxes or close the current dialog box.

Press:	To perform this action:
Tab, Shift+Tab	Move between command buttons.
Enter	Press the command button that the cursor is currently on. If the cursor is not on a command button, pressing Enter presses the default button for the dialog box.
Arrow keys	Move between command buttons in the direction of the arrow, changing the current button selection. If no button exists in the direction of the arrow, the cursor moves to the closest component.
Hot key	Select the command button associated with the hot key.
Mouse button	Select a command button when the you press the mouse button, and press the selected button when you release the mouse button.

Using Text Boxes

Use text boxes to enter text such as a filename or password.

Press:	To perform this action:
Arrow keys	Move within the text box. If you press UpArrow or DownArrow in a single-line text box, the cursor moves to the closest component in the direction of the arrow.
Home	Move to the first character in the text box.
End	Move to the last character in the text box.
Mouse button	Move to any position in the text box.
Delete	Delete a character.
Ctrl+Backspace	Delete from the cursor position to the beginning of the line.
Ctrl+K	Delete from the cursor position to the end of the line.

Using List Boxes

List boxes display lists of available choices. If all the choices won't fit in the box, the list box contains a scroll bar. A special type of list box, called a drop-down list box, looks like a text box followed by a prompt button labeled with a down arrow. The prompt button indicates that more choices are available.

Press:	To perform this action:
Arrow keys	Move the item selection bar up and down in the list to highlight an item. To move to another component, use Tab or the LeftArrow or RightArrow keys.
Home	Move to the first item in the list.
End	Move to the last item in the list.
PageUp	Move selection bar up one screen.
PageDown	Move selection bar down one screen.
Spacebar or Insert	Select the item the selection bar is on.

Ctrl+DownArrow	Open a drop-down list box.
Mouse button	Click the prompt button to open a drop-down list box. Click an item in the list to select it.

Running the Norton Program

The Norton program provides menu access to all of the Norton Utilities and a brief summary of each utility, including its function and use. From the Norton program, you can:

- Run several utilities in the same session, accessing each one quickly and easily.
- Control video and mouse options for all the utilities.
- Add or modify the settings in AUTOEXEC.BAT or CONFIG.SYS that were set when you installed Norton Utilities.
- Customize the interface by adding, deleting, and editing menu choices.
- Get advice on how to handle various system messages or problems you might encounter.

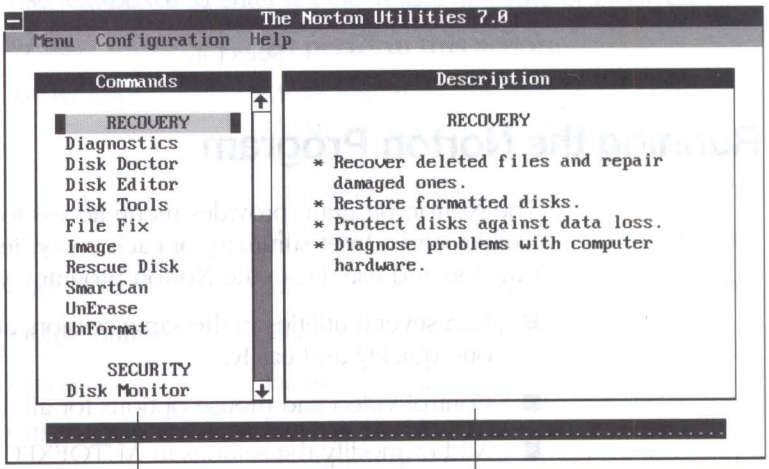
Since you can use the Norton program as a menu to select any program you use, you may want to start it from your AUTOEXEC.BAT file, and add to the Commands list all the common commands you normally run from the DOS command line.

To run the Norton program:

- Type NORTON at the DOS prompt.

The Norton Utilities main screen appears (Figure 2-1), from which you can run any of the Norton Utilities.

Figure 2-1 Norton Utilities main screen (commands sorted by topic)



By default the Norton Utilities programs are listed under four topics:

Recovery: Programs to diagnose problems and recover data, including utilities to safeguard your data before a problem occurs and perform low-level disk diagnosis and editing.

Speed: Programs to improve the performance of your system, including utilities that improve the organization of your disks to enhance data access efficiency.

Security: Programs to provide security against accidental data loss and unauthorized access.

Tools: Programs to simplify common tasks and provide enhancements to the operating system.

Each command is described in detail later in this manual.

To run a program from the Norton Utilities main screen:

- Double-click the program you want to run in the Commands list.

Or,

1 Highlight the program you want to run in the Commands list.

   Or,

   Click the program you want to run in the Commands list.

   Or,

   Type the program name at the Norton command line at the bottom of the screen.

   When you double-click a command, the program launches. When you highlight a command or click it, its name automatically appears on the Norton command line at the bottom of the screen followed by the blinking cursor. You can then add any optional command-line switches after the command name. See Appendix C, "Command Line Reference," for a description of the command-line switches available for each program.

2 Press Enter.

When you press Enter, the program launches. For example, if you highlight Norton Disk Doctor, you see NDD at the bottom of the screen. Pressing Enter launches the NDD.EXE program.

The Norton Program Pull-down Menus

The Norton Utilities main screen has three pull-down menus: Menu, Configuration, and Help. This section describes the commands available on each of these menus.

The Menu Menu

The Menu menu contains commands to customize the Commands list. With the commands on this menu, you can add, edit, or delete the commands or topics.

CAUTION: Be very careful of making changes to the Commands list. The changes you make can affect your ability to access the Norton Utilities from the Norton Utilities main screen. If you make changes and need to get your Norton program back to the way it originally looked, you can rerun the Install program from your original floppy disks and re-install only the Norton program. See Chapter 1, "Installing Norton Utilities," for instructions.

The Configuration menu provides a command to disable menu editing in the Norton program. If you choose to disable these commands, they won't appear in the Menu menu.

SORT BY NAME: Sorts the Commands list alphabetically by name. By default, commands appear sorted by topic.

SORT BY TOPIC: Sorts the Commands list by topic. By default, commands appear sorted under the following topics: Recovery, Speed, Security, and Tools.

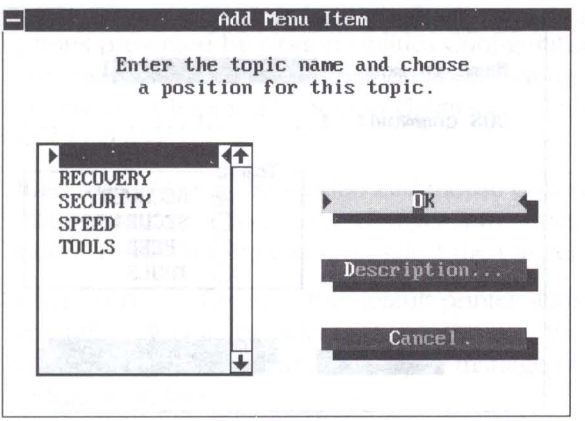
NOTE: Changes in the sort option take effect immediately and remain in effect for the current session and all subsequent sessions until you change them again. There is no special command to save the sort setting.

ADD MENU ITEM...: Adds commands and topics to the Commands list. If your Commands list is sorted by topic, a dialog box asks if you want to add a command, a topic, or cancel the operation.

To add a topic:

You can add a topic only when the list is sorted by topic. To add a topic, select Topic from the dialog box that appears when you choose ADD MENU ITEM.... Enter a topic name of up to 14 characters in the Add Menu Item dialog box (Figure 2-2). Then, use the arrow keys or the mouse to position the newly created topic.

Figure 2-2 Add Menu Item dialog box (topic)



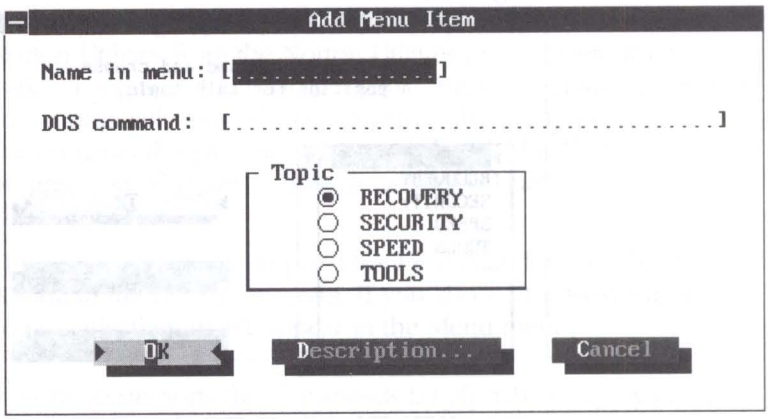
Select the Description button to enter a description of the topic. This description will appear in the Description box on the Norton Utilities main screen when you select the topic. Press F2 to change text attributes and emphasize parts of your description with underlined, reverse video, or bold text. Select OK when you finish typing your description. You return to the Norton Utilities main screen with the newly created topic highlighted.

You can have up to ten topics.

To add a command:

You can add a command whether the list is sorted by name or topic. To add a command, select Command from the dialog box that appears when you choose ADD MENU ITEM.... Enter a command name of up to 16 characters in the Add Menu Item dialog box (Figure 2-3). This command name will appear in the Commands list. Then, enter the DOS command (up to 128 characters) that you would type at the DOS prompt to execute the program. You can use the standard DOS wildcard characters * and ? in your commands.

Figure 2-3 Add Menu Item dialog box (command)



When you add a command, its name appears in alphabetical order among the existing commands, whether your display is sorted by name or by topic. To add the new command to a topic, select one of the Topic option buttons. Your command will appear under the selected topic if you choose SORT BY TOPIC in the Menu menu.

Select the Description button to enter a description of the command for the Description box on the Norton Utilities main screen. Press F2 to change text attributes and emphasize parts of your description with underlined, reverse video, or bold text. Select OK when you finish typing your description. You return to the Norton Utilities main screen with the newly created command highlighted.

You can have up to 256 commands.

EDIT MENU ITEM...: Edits the currently selected topic or command. This command works the same way as ADD MENU ITEM... described above.

DELETE MENU ITEM...: Deletes the currently selected topic or command. This command is dimmed (that is, you cannot select it) if you have selected a topic with commands listed beneath it. You can only delete topics whose commands you have already deleted. When you select DELETE MENU ITEM..., a dialog box appears asking for confirmation. Select Yes to delete the item or No to cancel the deletion.

EXIT: Quits the Norton program.

The Configuration Menu

The Configuration menu provides the same configuration options presented by Norton Utilities Configuration for your convenience. For more information about setting configuration options, see Chapter 27, "Norton Utilities Configuration (NUCONFIG)."

VIDEO AND MOUSE...: Sets video and mouse options for all Norton Utilities programs. To put the changes into effect, select the OK button. To discard the changes, select the Cancel button.

PRINTER SETUP...: Changes the default printer settings for the Line Print utility. When you select PRINTER SETUP..., the Configure Printer dialog box appears where you manage printer configuration files.

STARTUP PROGRAMS...: Modifies your startup files to run useful Norton Utilities programs each time you start your computer. When you select STARTUP PROGRAMS..., the Startup Programs dialog box appears with a checkmark next to the selected programs.

ALTERNATE NAMES...: Specifies that you want to use alternate names for some Norton Utilities programs. Some Norton Utilities programs have a long and short name. The long names are more descriptive, but command-line users may prefer the shorter names because they are faster to type at the DOS prompt.

PASSWORDS...: Sets password protection for some Norton Utilities programs. Passwords prevent unauthorized use of the Norton Utilities. Password-protected programs do not operate unless you enter the correct password. One password is assigned to all of the programs that you chose for password protection.

CAUTION: You *must* remember this password or you won't be able to use any of the password-protected programs.

MENU EDITING...: Disables or enables the menu-editing features on the Menu menu. To disable menu editing, select the Disable Editing option button and select OK. The following items on the Menu menu disappear: ADD MENU ITEM..., EDIT MENU ITEM..., and DELETE MENU ITEM....

The Help Menu

The Help menu provides several options for getting help when using the Norton Utilities. The Help menu is the same for all full-screen utilities.

THE NORTON ADVISOR: Lists common disk problems and error messages from DOS, CHKDSK, and some common applications. For each problem, the Norton Advisor provides an explanation and recommends a solution. Many solutions recommend using one of the Norton Utilities programs to correct the problem. In this case, a command button appears that you can use to run the recommended program.

The Norton Advisor provides help for the following areas:

Common Disk Problems: Lists the most common problems that are likely to occur on your disks.

DOS Error Messages: Lists the most common DOS error messages and recommends a solution for each of them.

CHKDSK Error Messages: Lists the most common CHKDSK error messages and recommends a solution for each of them. Refer to your DOS manual for information on the CHKDSK command.

Application Error Messages: Lists the most common WordPerfect, Lotus 1-2-3, Paradox, Excel, and dBASE error messages and recommends a solution for each one.

Search: Searches for error messages. Enter any part of the error message that you want to search for. Check the Include Application Error Messages check box to include the application error messages in your search.

INDEX: Provides an index of online Help topics. To select a topic, highlight the topic and select the Go To button.

KEYBOARD: Provides help on using the keyboard.

MOUSE: Provides help on using a mouse.

DIALOG BOXES: Provides help on using dialog boxes.

PULLDOWN MENUS: Provides help on using the pull-down menus.

USING HELP: Provides help on using the online Help system.

ABOUT...: Provides information about the Norton Utilities version, registration, and the computer it's running on.

Configuring for Multiple Users

If you are a system administrator or MIS director setting up the Norton program differently for several users, you can use the File Attributes utility to change the file attributes of the SYMCFG.BIN file, which stores the Norton program settings, to read-only. Setting the read-only attribute prevents someone else from easily changing the configuration.

You can also create multiple configurations on your system for subsequent use on other users' computers by renaming the SYMCFG.BIN file after you have finished making changes. For example, to set up a specialized Norton program interface for Bill, Ted, and Ann, rename SYMCFG.BIN to BILL.BIN after customizing it for Bill, to TED.BIN after customizing it for Ted, and to ANN.BIN after customizing it for Ann. When you copy these files to the individuals' SYMANTEC directory on their computers, rename their existing SYMCFG.BIN file if they have customized it. Then, rename the file you customized for the user back to the original name of SYMCFG.BIN, so that the Norton program can find and use it.

Getting Help

Norton Utilities provides several ways of accessing the online Help system.

To select from a list of help topics, choose INDEX from the Help menu on the Norton Utilities main screen and all other full-screen utilities. A help index appears where you can select a topic.

To read the context-sensitive help on any program, press F1. A dialog box appears with helpful information about the utility you are using.

To read the command-line Help for any program, type the program name followed by `/?` at the command line.

In addition, NDOS provides online Help for all NDOS commands DOS commands, and Norton Utilities programs from the command line. With NDOS installed, type the name of a command or program, then press F1 to read the online Help.

For more information on using online Help, choose USING HELP from the Help menu on the Norton Utilities main screen.

PART

II Tutorials

This part of the *Norton Utilities User's Guide* contains the following tutorials:

- The Recovery Tutorials provide step-by-step instructions on using Norton Utilities to recover data.
- The Prevention Tutorials provide step-by-step instructions on using Norton Utilities to prevent data loss.
- The Performance Tutorials provide step-by-step instructions on using Norton Utilities to speed up your computer use.

CHAPTER

3 Recovery Tutorials

This chapter provides step-by-step procedures for recovering lost or corrupt data. It describes the following:

- Detecting and preventing problems with your computer using Norton Disk Doctor
- Recovering erased (deleted) files with UnErase
- Recovering from accidental disk formatting using UnFormat
- Repairing disks with Disk Tools
- Recovering from computer failure with Rescue Disk
- Diagnosing and correcting problems with Lotus 1-2-3, Symphony, Quattro Pro, WordPerfect, Excel, dBASE, and Clipper files

Diagnosing Disks with Norton Disk Doctor

This section describes using Norton Disk Doctor to:

- Determine the health of your disks
- Correct disk errors

See Chapter 26, "Norton Disk Doctor (NDD)," for more information on diagnosing and repairing disks and configuring Norton Disk Doctor.

Norton Disk Doctor performs several tests to discover where disk problems may lie and then, optionally, a test of the physical surface of the disk. It warns you if problems are found, and gives you the option of correcting them.

TIP: Practice preventive maintenance by running Norton Disk Doctor regularly. Choose STARTUP PROGRAMS... from the Norton Utilities main screen's Configuration menu and select Diagnose Disk Problems to place the necessary command in your AUTOEXEC.BAT file. Norton Disk Doctor will then run a quick test of your hard disk every time you start your computer.

Diagnosing a Disk

Norton Disk Doctor provides automatic operation with prompts and informational screens to guide you along the way.

You can stop any Norton Disk Doctor test before it is finished by pressing Esc.

To start Norton Disk Doctor:

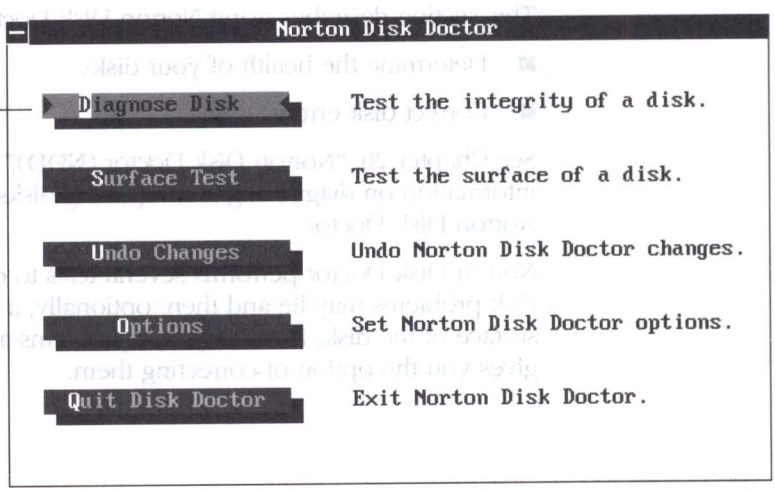
- Choose Disk Doctor in the Commands list on the Norton Utilities main screen.

Or,

- Type NDD at the DOS prompt.

  The Norton Disk Doctor main menu appears as illustrated in Figure 3-1.

Figure 3-1 Norton Disk Doctor main menu



To diagnose a disk:

1 Select Diagnose Disk.

Norton Disk Doctor analyzes the partition table of your hard disk(s) and then presents a list box of available drives.

2 Select the drive to diagnose.

You can select more than one drive by highlighting each drive and pressing Spacebar.

NOTE: Norton Disk Doctor also diagnoses and repairs compressed drives. See "Compressed Drives" in Chapter 26, "Norton Disk Doctor (NDD)," for more information

3 Select Diagnose to begin the suite of tests.

If you're testing a compressed drive, Norton Disk Doctor makes two passes: the uncompressed or host drive is checked first, then the compressed drive is checked.

If Norton Disk Doctor encounters an error, it displays a screen explaining the problem and asks for your permission to correct it. Simply follow the screen prompts to fix the error.

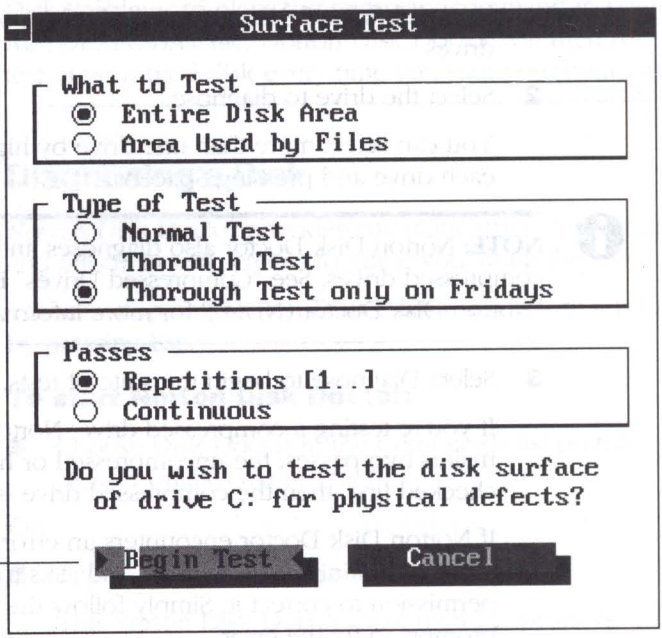
Before making any changes, Norton Disk Doctor asks if you want to create an UnDo file—just in case the changes made were not exactly what you expected. As a safety precaution, always create the UnDo file. You need a floppy disk for the UnDo file. Follow the screen prompts. Norton Disk Doctor saves disk changes in a file called NDDUNDO.DAT on the floppy disk.

TIP: Have a blank, formatted floppy disk handy for the UnDo file, just in case Norton Disk Doctor finds any errors.

NOTE: If Norton Disk Doctor prompts you for more than one UnDo file, you must save each UnDo file on a separate floppy disk or the new one overwrites the previous one.

After all the tests complete, the Surface Test dialog box appears, as illustrated in Figure 3-2.

Figure 3-2 Surface Test dialog box



The Surface Test tests the disk surface for physical defects and can take some time. The Surface Test is optional, but you should run it at least once each week.

4 Select Begin Test to accept the default settings.

The Norton Disk Doctor screen shows the progress of the surface test. When the testing completes, a brief summary screen shows the results of all the tests.

5 Select Report to generate and display a report of the test results, which you can print.

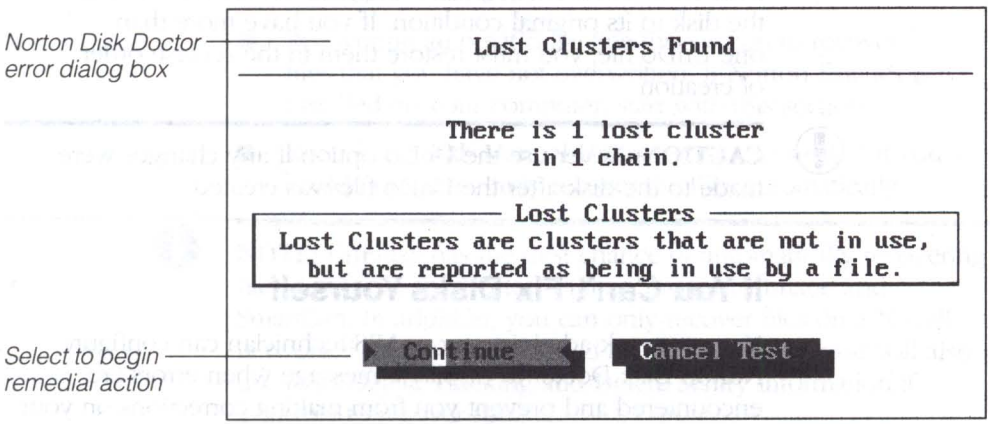
This step is optional but highly recommended as it is the only record of what occurred during testing.

CAUTION: If Norton Disk Doctor found any errors, save the report to a disk other than the one you're testing to make sure that you do not write to a damaged disk.

If an Error is Found

If Norton Disk Doctor finds an error, don't panic. It displays a screen explaining the problem and asks for your permission to correct it. Simply follow the screen prompts to fix the error. For instance, a common and usually harmless error is lost clusters, as illustrated in Figure 3-3.

Figure 3-3 Lost Clusters Found error dialog box


Norton Disk Doctor error dialog box
Lost Clusters Found
There is 1 lost cluster in 1 chain.
Lost Clusters
Lost Clusters are clusters that are not in use, but are reported as being in use by a file.
Select to begin remedial action
Continue
Cancel Test

Files are written to disk in units called clusters, usually 2K to 8K in size depending on the size of the disk, but larger on very large hard disks (16K or 32K on disks over 512 MB in size). Lost clusters can appear if you turn the power off or reboot without properly exiting an application. In this case, the application does not perform its usual DOS housekeeping chores, and DOS thinks these clusters are allocated to a file when, in fact, no file claims them. The lost clusters take up room on the disk without actually being used. Norton Disk Doctor frees the lost clusters so that the disk space becomes available again for files.

NOTE: When Norton Disk Doctor corrects lost clusters, it can write the clusters to a file. They appear in the root directory with names like FILE0000._DD, FILE0001._DD, and so on. Examine the files with a text editor or word processor to verify they do not contain any valuable data, then delete them.

UnDoing Changes

Norton Disk Doctor asks you if you want to create an UnDo file whenever it corrects a disk error. To undo disk changes that were made the last time you ran Norton Disk Doctor, select Undo Changes on the Norton Disk Doctor main menu, then select the letter of the drive containing the UnDo file. Norton Disk Doctor searches for the NDDUNDO.DAT file and returns the disk to its original condition. If you have more than one UnDo file, you must restore them in the reverse order of creation.

CAUTION: Never use the UnDo option if any changes were made to the disk after the UnDo file was created.

If You Can't Fix Disks Yourself

Your network administrator or MIS technician can configure Norton Disk Doctor to display a message when errors are encountered and prevent you from making corrections on your own. If your computer is configured in this fashion, contact the appropriate person for help if Norton Disk Doctor finds an error.

Recovering Erased Files with UnErase

This section describes using UnErase to search for and recover erased (deleted) files. See Chapter 34, "UnErase (UNERASE)," for more information on this utility.

WARNING: If you have just purchased Norton Utilities to recover files, do not install the Norton Utilities on your hard disk. Installing the Norton Utilities may overwrite the files you want to recover, destroying the data. Instead, see the "Recovering with the Emergency Disk" section below.

Data for an erased file doesn't immediately disappear; it remains intact on the disk until you write over it. The disk space it occupied is simply marked for reuse. At this point, you can use UnErase to recover the erased file. When you save a new file, DOS writes it in the area marked for reuse. When DOS writes a new file in the area containing data for an erased file, you can no longer recover the overwritten data. For more information about the process of deleting files, see Appendix A, "Disk Companion."

This section covers three methods of recovering files with UnErase.

- Recovering with the Emergency Disk: Start with this section if you have just purchased the Norton Utilities to recover an erased file.
- Recovering automatically: See this section to recover files that you have not overwritten. If Norton Utilities is installed on your computer, start with this section.
- Recovering with Manual UnErase: See this section if you could not successfully recover the files automatically.

NOTE: UnErase has the best chance of automatically recovering files if you use the Norton Utilities programs Image and SmartCan. In addition, you can only recover files on a Novell network if they were protected by SmartCan. UnErase will also use DOS Delete Tracking and Delete Sentry information if available to recover files.

Recovering with the Emergency Disk

If you have an emergency and you've purchased the Norton Utilities to restore erased files, do not install the Norton Utilities on your hard disk. Installation might overwrite erased files, preventing full recovery.

To recover files with the Emergency Disk:

1. Place the Emergency Disk in drive A:.
2. Type `A:UNERASE` at the DOS prompt.

   The UnErase Program starts.

At this point, you can recover your file as described in the following section, "Recovering Files Automatically." Since you've already started UnErase, skip over the "To start UnErase" procedure.

Recovering Files Automatically

This section describes using UnErase to automatically recover erased files that have remained intact. When you need to recover an erased file, try these procedures before trying Manual UnErase.

You may not be able to recover all of the files UnErase displays, and recovering one file can interfere with recovering others. If you are recovering more than one file, recover the most important files first or use the UNERASE TO... option to place the recovered files onto a floppy disk.

To start UnErase:

- Choose UnErase in the Commands list on the Norton Utilities main screen.

Or,

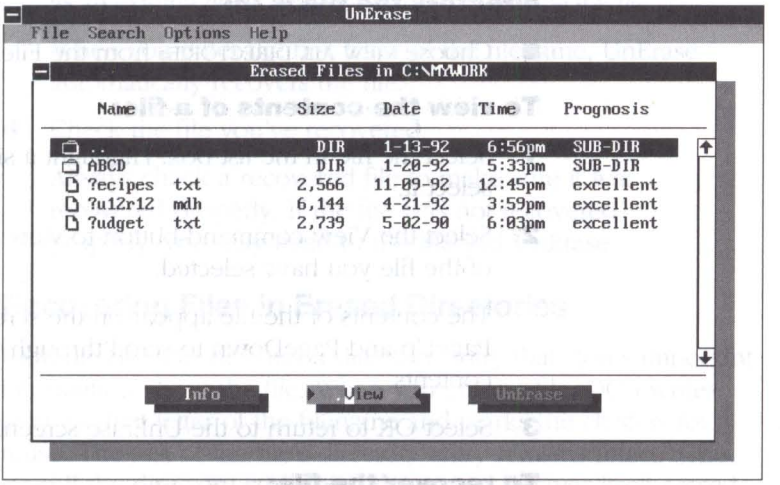
- Type UNERASE at the DOS prompt.

  UnErase checks your disk for files protected with SmartCan or Erase Protect. If you have used both these utilities, a dialog box asks whether you want to recover files protected by SmartCan or Erase Protect. Select the utility you used to protect the file you want to recover.

  UnErase then displays erased files and directories in the current directory and the names of existing subdirectories (Figure 3-4). Use PageUp and PageDown to scroll up and down the list of erased files.

TIP: To protect against data loss, run SmartCan every time you start your computer. Choose STARTUP PROGRAMS... from the Norton Utiltities main screen's Configuration menu and select Start SmartCan to place the SmartCan command in your AUTOEXEC.BAT file.

Figure 3-4 UnErase screen



For each erased file, UnErase displays the name, size, date, time, and prognosis for recovery. The recovery prognosis can be excellent (for files protected with SmartCan), very good, good, average, and poor.

Unless you protected the erased file with SmartCan, a question mark appears in place of the first letter of the filename. When you erase a file, DOS overwrites the first letter of the filename.

To change to another drive:

1. Choose CHANGE DRIVE... from the File menu.

   A list box appears containing the available drives.

2. Select the drive containing the file you want to recover.

To change to another directory:

1. Choose CHANGE DIRECTORY... from the File menu.

   A directory tree appears.

2. Select the directory containing the file you want to recover.

   Or,

   Use Speed Search (just start typing the directory name).

To view all directories if you don't know what directory the file is in:

- Choose VIEW ALL DIRECTORIES from the File menu.

To view the contents of a file:

1. Select the file in the list box. Highlight a single file to select it.
2. Select the View command button to view the contents of the file you have selected.

   The contents of the file appear on the screen. Use PageUp and PageDown to scroll through the file contents.
3. Select OK to return to the UnErase screen.

To recover the file:

1. Select the file you want to recover. Select your most important or smaller files first.

   To tag several files to be recovered together:

   - Highlight and press the Spacebar to tag individual files, marking them with arrows.

   Or,

   - Use the SELECT GROUP... command in the File menu to specify a group of files using the DOS wildcards (* and ?).
2. Select the UnErase command button.

   A dialog box appears where you enter the first letter of the filename. If the file was protected with SmartCan, the first letter is preserved, and UnErase recovers the file.

   If the file has been overwritten, UnErase advises you to search for the file or to use Manual UnErase to recover it. See "Searching for Erased Files" and "Recovering with Manual UnErase" later in this chapter for details.
3. Enter the first letter of the filename.

   You don't need to enter the original letter; any letter will do as long as you don't duplicate an existing filename. To avoid overwriting any files, UnErase lists as

unavailable any letters that would create the same name as an existing file. If necessary, you can rename the file later.

When you enter the first letter of the filename, UnErase automatically recovers the file.

4 Check the file you've recovered.

Always check a recovered file to make sure it was recovered properly. If the file was not recovered properly, you may need to use Manual UnErase.

Recovering Files in Erased Directories

Each file on your disk has a directory entry that stores important information about the file. When you erase a file, DOS writes over the first letter of the filename and marks the clusters for reuse. The rest of the file's directory entry remains intact. Thus, even if the directory containing the erased file was itself erased, the file's directory entry remains intact until overwritten.

NOTE: Just as data of erased files can be overwritten, DOS can overwrite directory entries of erased files with new file entries, which may prevent complete recovery.

To recover a file in an erased directory:

1 Select the name of the erased directory in the list box.

2 Select the UnErase button.

A dialog box appears where you enter the first letter of the directory name.

If the directory has been overwritten UnErase advises you to search for lost names to recover it. Lost names searches are described in the following procedure.

3 Enter the first letter of the directory name.

You don't need to enter the original letter; any letter will do. To avoid overwriting any files, UnErase lists as unavailable any letters that would create the same name as an existing file. If necessary, you can rename the directory later using Norton Change Directory (NCD).

When you enter the first letter of the directory name, UnErase automatically recovers the directory.

4 Change to the newly restored directory.

5 Use UnErase to recover files in the directory.

To recover a file in an erased directory that you couldn't automatically recover:

- Choose FOR LOST NAMES from the Search menu.

  UnErase begins searching for lost names. You can then view the found files and use UnErase to recover the files you want. When you recover files, UnErase saves them in the current directory, since the original directory no longer exists.

Searching for Erased Files

If you cannot find the file you want to recover, use the UnErase search options. With them, you can search for erased files containing:

- Specific types of data that you want to recover
- A specific text string

To search for specific data types:

1 Choose FOR DATA TYPES... from the Search menu.

  The Search for Data Type dialog box appears. In this box, specify a search for normal text, Lotus 1-2-3 or Symphony data, dBASE data, and Other Data, which searches for other data types.

2 Select the type of data you want to search for and select OK.

  UnErase searches for erased files containing the specified type of data and lists found files on the screen with a generic filename. You can then view the files to find the one you want and use UnErase to recover it.

To search for a specific text string:

1 Select FOR TEXT... from the Search menu.

  The Search for Text dialog box appears, where you enter the text you want to search for. When searching for a document, enter a text string that existed in the file. When searching for a Lotus 1-2-3 or dBASE file,

enter a value in the file. Since parts of the file may be overwritten, you may need to search several times with different search strings.

2 Enter the text you want to search for.

A check appears in the Ignore Case check box specifying a case-insensitive search. Uncheck the check box to make the search case-sensitive.

UnErase searches for erased files containing the specified text and lists found files on the screen with a generic filename. You can then view the files to find the one you want and use UnErase to recover it.

Recovering with Manual UnErase

Use Manual UnErase in the following situations:

- You've tried automatic recovery and it was unsuccessful.
- You're recovering text and you can see that the data is not in the right order on the screen.

Always try the procedures in "Recovering Files Automatically" earlier in this chapter before using Manual UnErase.

To manually UnErase a file:

1 Select the file you want to recover.

2 Choose MANUAL UNERASE... from the File menu.

A dialog box appears where you enter the first letter of the filename.

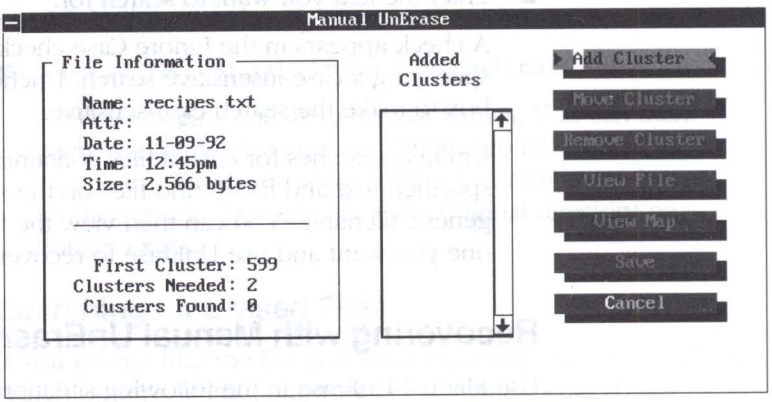
3 Enter the first letter of the filename.

You don't need to enter the original letter; any letter will do. To avoid overwriting any files, UnErase lists as unavailable any letters that would create the same name as an existing file. If necessary, you can rename the file later.

The Manual Unerase dialog box appears (Figure 3-5). The file information on the left of the screen lists the first cluster, the clusters needed, and the clusters found for this file. Use the found clusters as a base that you can add to and subtract from to reconstruct the file. In

reconstructing the file, you try to get the clusters found as close as possible to the clusters needed.

Figure 3-5 Manual Unerase dialog box

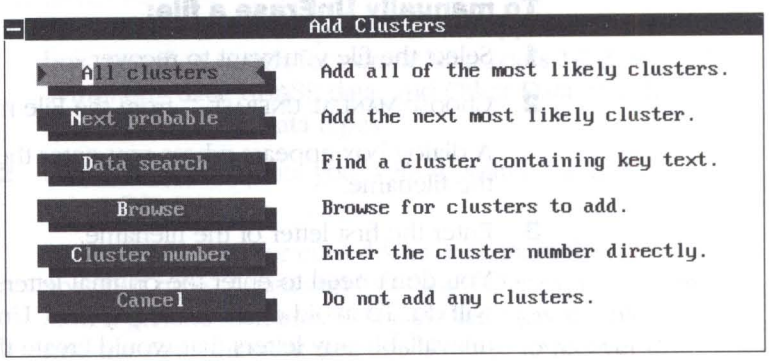


To add all clusters found:

1 Select Add Cluster from the Manual UnErase dialog box.

The Add Clusters dialog box illustrated in Figure 3-6 appears.

Figure 3-6 Add Clusters dialog box



NOTE: UnErase only lets you add clusters not in use by existing files.

2 Select All Clusters to add all the clusters found to the file.

You can now review the file contents and add or subtract clusters.

To review the file's contents:

1 Select View File.

A screen appears listing the file contents divided by cluster.

You can then add clusters or delete any clusters that don't belong in the file.

2 Select OK to return to the Manual UnErase dialog box.

To add the next probable cluster:

1 Select Add Cluster from the Manual UnErase dialog box.

2 Select the Next Probable command button from the Add Clusters dialog box to add the next probable cluster.

To delete a cluster:

1 Select the number of the cluster that you want to delete in the Added Clusters list of the Manual UnErase dialog box.

The cluster number appears above each cluster in the View list box.

2 Press Delete to remove the cluster.

If some data is missing from the file, you can add clusters to the file using the above procedures.

To change the order of the clusters:

1 Select the cluster you want to move in the Added Clusters list box and press the Spacebar to mark it with arrows.

2 Press UpArrow or DownArrow to reposition the selected cluster.

3 Press Enter to drop the cluster in the new location.

To save the file:

- Choose Save.

  When you save the recovered file, the selected clusters are written to the file, and you automatically return to the UnErase screen.

  If you selected more or less data than the file originally contained, Manual UnErase asks you to Save anyway or Resume the procedure.

  To leave Manual UnErase without saving, select Cancel. A dialog box asks if you want to abandon your work in progress. If you don't want to save your work, select Yes. If you want to save your work, select No.

Searching for Text with Manual UnErase

You can search for clusters containing specific text to add to the file you're recovering from the Manual UnErase dialog box.

To search for specific text:

1. Select Add Clusters from the Manual UnErase dialog box.

   The Add Clusters dialog box appears.

2. Select the Data Search command button.

   The Data Search dialog box appears.

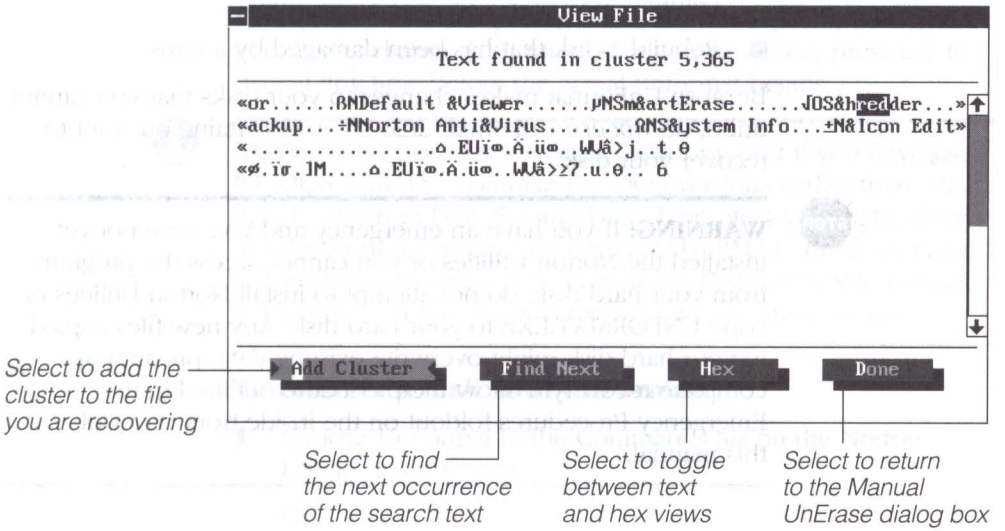
3. Enter the text you want to search for in ASCII or hexadecimal.

   A check appears in the Ignore Case check box specifying a case-insensitive search. Uncheck the check box to make the search case-sensitive.

4. Select Find.

   Manual UnErase displays the first cluster containing the specified text (see Figure 3-7).

Figure 3-7 View File dialog box


View File
Text found in cluster 5,365
«or.....ßNDefault &Viewer.....µNSm&artErase.....ÑOS&hredder...»
«ackup...÷NNorton Anti&Virus.....ΩNS&ystem Info...±N&Icon Edit»
«.....⌂.EUï∞.Ä.ü∞..WÛâ>j..t.0
«ø.ïσ.]M....⌂.EUï∞.Ä.ü∞..WÛâ>≥7.u.0.. 6
Add Cluster
Find Next
Hex
Done
Select to add the cluster to the file you are recovering
Select to find the next occurrence of the search text
Select to toggle between text and hex views
Select to return to the Manual UnErase dialog box

5 To add the cluster to the file you are recovering, select Add Cluster if the cluster belongs in the file.

Or,

If the cluster does not belong in the file, select Find Next to find the next cluster containing the specified text.

6 Select Done when you have finished adding clusters.

7 Select Save to save the file.

Recovering Disks with UnFormat

This section describes how to recover a disk with UnFormat. See Chapter 35, "UnFormat (UNFORMAT)," for more information on using UnFormat.

Use UnFormat to:

- Recover a hard disk that has been accidentally reformatted
- Restore a floppy disk that has been formatted with Safe Format (or the FORMAT command in later versions of DOS)

- Rebuild a disk that has been corrupted due to a power failure
- Rebuild a disk that has been damaged by a virus

Because UnFormat makes changes to your disks that you cannot undo, do *not* use UnFormat unless you're certain you want to recover your disk.

WARNING: If you have an emergency and you have not yet installed the Norton Utilities or you cannot access the program from your hard disk, do not attempt to install Norton Utilities or copy UNFORMAT.EXE to your hard disk. Any new files copied to your hard disk might overwrite existing data, preventing complete recovery. Follow the procedure outlined in the Emergency Procedures foldout on the inside front cover of this manual.

The Image File

When you run UnFormat, it searches the disk for lost bookkeeping information stored in a file called IMAGE.DAT created by the Norton Utilities Image program. Image takes a snapshot of the critical system information area of your hard disk as described in Chapter 20, "Image (IMAGE)." UnFormat also looks for files created by the Mirror program in later versions of DOS.

The recovery process is faster and more reliable when you use the Image or Mirror file; however, the file is not absolutely necessary for UnFormat to operate. UnFormat can still recover data, but don't expect a complete recovery. At a minimum, the root directory will be lost. In some situations, you might not get anything useful.

TIP: To protect against data loss, run Image every time you start your computer. Choose STARTUP PROGRAMS... from the Norton Utilities main screen's Configuration menu and select Save Disk Format Data to place the Image command in your AUTOEXEC.BAT file.

Recovering a Disk with UnFormat

During the UnFormat procedure, you receive prompts to guide you. If you change your mind after you've started, press Esc to stop at any time before the actual unformat begins.

NOTE: UnFormat *cannot* recover a floppy disk if you have used the DOS FORMAT command in DOS versions earlier than 5.0, or the /U switch in DOS 5.0 and later. To protect your data, always use the Norton Utilities Safe Format (SFORMAT) program instead to format floppy disks. See "Formatting Disks with Safe Format" in Chapter 4, "Prevention Tutorials," for more information.

To recover a disk with UnFormat:

1. Choose UnFormat in the Commands list on the Norton Utilities main screen.

   Or,

   Type `UNFORMAT` at the DOS prompt.

   The Unformat dialog box appears.

2. Read the cautionary message to make sure you are following the right course, then select Continue.

   A list of available drives appears.

3. Select the drive to recover from the drives list box.

   Or,

   Type the drive letter.

   UnFormat asks if you've used Image or the DOS Mirror program to create a copy of the system area of your disk.

4. Select Yes if you have used either of these programs, or if you're not sure.

   A list of the files currently stored in the root directory on the selected drive is displayed along with the message "Are you sure you want to unformat it?"

5. Select Yes to continue.

UnFormat searches for the Image and Mirror files. If found, a message box indicates the last time the files were updated.

NOTE: If UnFormat finds more than one copy of the Image file, you can choose to use the most recent version or the previous version. The reason for this is simple: If disk damage occurs late in the day, you may not notice it until the next day after you've started your computer. If Image is included in your AUTOEXEC.BAT file, Image automatically updated a copy of the damaged system area when you started your computer, thus making the most recent version of IMAGE.DAT unusable. In this case, select Previous to restore the previous version.

6 Select Recent to restore the most recent version of IMAGE.DAT.

Or,

Select Previous to restore the previous version of IMAGE.DAT.

7 Select Yes to continue.

You can perform a full or partial restoration. A full restoration recovers the boot record, file allocation tables, and root directory.

8 Select Full if you're not sure whether you want a partial restoration or a full restoration of your disk.

Or,

Select Partial if you know exactly what the problem is.

For example, select Partial if you know only the boot record is damaged.

Once you choose the recovery method, UnFormat reconstructs the data. A disk map depicts the progress of directory searching and file recovery.

NOTE: If UnFormat cannot find the Image or Mirror File, UnFormat still tries to reconstruct your disk. However, the subdirectories directly under your root directory will be renamed DIR0, DIR1, and so on. Use the RENAME... command in the Directory menu of Norton Change Directory to rename the

directories, as described in Chapter 23, "Norton Change Directory (NCD)." In addition, all filenames in your root directory will be lost. Use the Manual UnErase procedure to attempt recovery of these files, as described in "Recovering with Manual UnErase" earlier in this chapter.

When UnFormat finishes reconstructing your disk, the program advises you to run Norton Disk Doctor. This doesn't necessarily mean that you have a problem with the recovered disk. Norton Disk Doctor simply cleans up any disk problems that might have occurred due to changes made on the disk after the IMAGE.DAT file was created. See "Diagnosing Disks with Norton Disk Doctor" earlier in this chapter for more information on running Norton Disk Doctor.

If you want to start your system from the recovered disk but it does not work, use Disk Tools to make the disk bootable. See "Making a Disk Bootable" later in this chapter for the procedure to make a disk bootable.

Repairing Disks with Disk Tools

This section describes Disk Tools, which is a set of utilities that perform data protection and recovery operations. Using Disk Tools you can:

- Make a disk bootable after it's been formatted
- Recover from the DOS RECOVER command
- Revive a defective floppy disk
- Mark a cluster as good or bad

See Chapter 11, "Disk Tools (DISKTOOL)," for more information on the Disk Tools utilities.

Making a Disk Bootable

Use the Make A Disk Bootable option to make a previously formatted floppy or hard disk bootable, even if it contains data. Use this when you receive the error message "No room for system files" after attempting to use the DOS SYS command or when the disk doesn't boot for any reason.

To make a disk bootable:

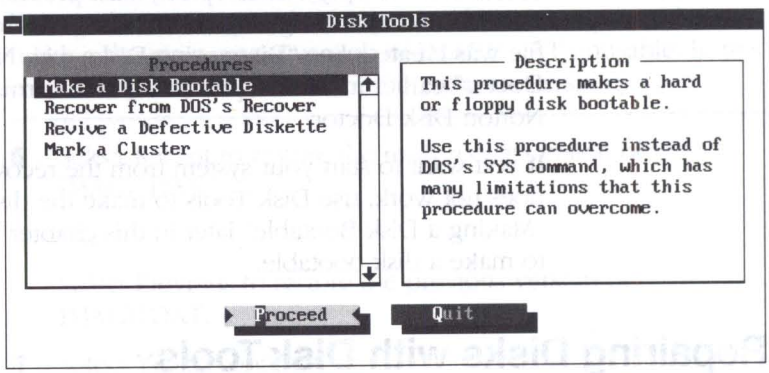
1 Choose Disk Tools in the Commands list on the Norton Utilities main screen.

Or,

Type `DISKTOOL` at the DOS prompt.

The Disk Tools dialog box appears (Figure 3-8).

Figure 3-8 Disk Tools dialog box


Disk Tools
Procedures
Make a Disk Bootable
Recover from DOS's Recover
Revive a Defective Diskette
Mark a Cluster
Description
This procedure makes a hard or floppy disk bootable.
Use this procedure instead of DOS's SYS command, which has many limitations that this procedure can overcome.
Proceed
Quit

2 Select Make A Disk Bootable.

A list of available drives appears.

3 Select the disk you want to make bootable from the list of active drives and select OK.

4 If you selected a floppy disk, insert it into the proper disk drive and select OK.

When the procedure completes, a dialog box appears to inform you.

5 Select OK.

Recovering from the DOS RECOVER Command

Use this option to restore your disk to the state it was in before you ran the DOS RECOVER command. The RECOVER command places all files, including those in subdirectories, into the root directory and assigns them cryptic, computer-generated names. This Disk Tools option gives you back your subdirectory

structure and original filenames (except for filenames originally in the root directory).

To recover from the DOS RECOVER command:

1. Choose Disk Tools in the Commands list on the Norton Utilities main screen.

   Or,

   Type `DISKTOOL` at the DOS prompt.

   The Disk Tools dialog box appears (see Figure 3-8).

2. Select Recover From DOS's Recover.

   A message box appears, explaining the procedure.

3. Select OK to proceed.

   A list of available drives appears.

4. Highlight the drive to recover and select OK.

   If you are recovering a floppy disk, a dialog box appears reminding you to insert the floppy disk. Insert the disk and select OK.

   A warning box appears, reminding you of when you should be using this procedure.

5. Select Yes if your disk matches the symptoms listed in the warning.

   A final warning box appears, asking if you're certain you want to continue with the procedure.

6. Select Yes to proceed.

   Disk Tools displays a disk map showing the progress of the directory search and file recovery. Press Esc to halt the process at any point.

   When it's done, Disk Tools names the directories under your root directory DIR00001, DIR00002, and so on. It names the files in the root directory FILE0001, FILE0002, and so on. Files in subdirectories regain their original names.

Reviving a Defective Diskette

Use this option to repair a floppy disk when you receive "General failure error," "Sector not found error," "Read fault error," or "Seek error" messages.

To revive a defective diskette:

1. Choose Disk Tools in the Commands list on the Norton Utilities main screen.

   Or,

   Type `DISKTOOL` at the DOS prompt.

   The Disk Tools dialog box appears (see Figure 3-8).

2. Select Revive a Defective Diskette.

   A list of available floppy drives appears.

3. Select the disk to revive from the drives list.

4. Insert the defective floppy disk in the drive and select OK.

   A dialog box displays the progress, and another dialog box notifies you when the process finishes.

5. Select OK.

Marking a Cluster

Use this option to mark a cluster *bad* and prevent DOS from using it, or mark a cluster *good* and allow DOS to use it.

To mark a disk cluster as good or bad:

1. Choose Disk Tools in the Commands list on the Norton Utilities main screen.

   Or,

   Type `DISKTOOL` at the DOS prompt.

   The Disk Tools dialog box appears (see Figure 3-8).

2. Select Mark A Cluster.

   An explanation box appears.

3. Select OK.

4 Select the disk on which you want to mark clusters.

If you selected a floppy disk drive, a dialog box reminds you to insert the disk into the drive. Select OK.

5 Type the number of the chosen cluster.

Valid cluster numbers vary for different disk types.

6 Check the Good or Bad check box and select OK.

Disk Tools informs you of the operation and returns you to the Disk Tools dialog box.

Restoring with Rescue Disk

This section describes using the Rescue Disk utility to:

- Create a rescue disk for your system so that you can recover in the event of computer failure
- Restore system information from your rescue disk when your computer's hard disk or system information becomes corrupted

See Chapter 28, "Rescue Disk (RESCUE)," for more information on creating and restoring from a rescue disk.

Creating a Rescue Disk

Create a rescue disk to save vital system and hard disk information for use in case of computer failure.

TIP: Update your rescue disk any time you change your computer's partition tables or logical drive assignments, or if you add a new device driver or compressed disk drive. You should also update your rescue disk whenever you modify your AUTOEXEC.BAT or CONFIG.SYS file.

To create a rescue disk:

1 Choose Rescue Disk in the Commands list on the Norton Utilities main screen.

Or,

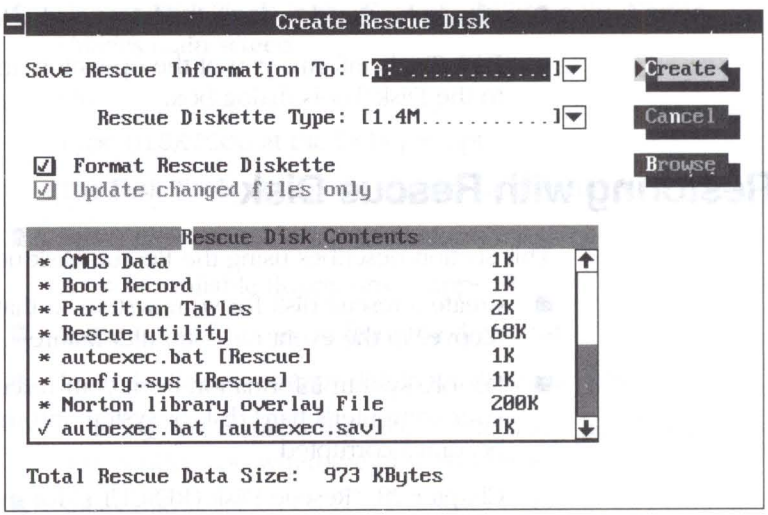
Type RESCUE at the DOS prompt.

The Rescue Disk dialog box appears.

2 Select Create.

The Create Rescue Disk dialog box in Figure 3-9 appears, listing your rescue disk options.

Figure 3-9 Create Rescue Disk dialog box



3 Select the disk drive for the rescue disk and the files to save to it.

When you choose a floppy disk from the Save Rescue Information To drop-down list box, Rescue Disk puts its files in the disk's root directory. If you choose another type of drive, a text box appears for you to type the directory for the rescue disk files. The directory must already exist.

CAUTION: Do not store a system's rescue files on a hard disk on that system, because restoring system information from a damaged disk may not work. Use either a floppy disk or a network drive that you can access from another system.

Check the Format Rescue Diskette check box to format the floppy disk before the rescue files are copied to it. Any data already on the disk is erased during the format, so use a blank disk. Format Rescue Diskette also

makes a floppy rescue disk bootable (you can start your computer from it), which is helpful if you can no longer start your computer from its hard disk.

Check Update Changed Files Only to update an existing rescue disk if you've changed your computer's configuration.

The Rescue Disk Contents list box displays the information and files that are saved to your rescue disk. The options with an asterisk (*) next to them cannot be deselected—they must be on the rescue disk. Options or filenames with a checkmark next to them can be deselected; simply highlight them and press the Spacebar. For maximum protection, however, put as many of the listed files on the disk as will fit.

Finally, if you want to add files to the rescue disk that aren't in the list box, use the Browse command button to locate those files.

4 When you finish choosing the rescue disk options, select Create to create the disk.

5 Select OK once the operation completes.

6 If you used a floppy disk, remove it from the drive, label it "Rescue Disk," write-protect it, and store it in a safe place.

Restoring from a Rescue Disk

Use your rescue disk to restore critical system information. Before you can restore this information, you must have previously created a rescue disk using the procedure described in the preceding section.

CAUTION: Use this procedure only if you cannot access partitions on your hard disk and you've already tried Norton Disk Doctor.

To restore your computer from the rescue disk:

1 Start your computer from the rescue disk.

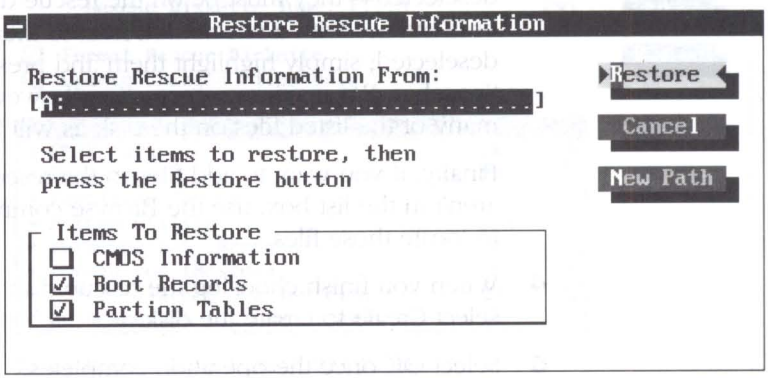
2 Type RESCUE at the DOS prompt.

The Rescue dialog box appears.

3 Select Restore.

The Restore Rescue Information dialog box shown in Figure 3-10 appears for you to type the drive or directory you are restoring from, and to check the information to restore.

Figure 3-10 Restore Rescue Information dialog box



4 Select your restore options.

5 Select Restore to continue.

For each option you checked in Step 4, a dialog box informs you of when you saved this information and asks if you want to restore it.

6 Select Yes for each part of your system information you want restored.

After your choices are restored, a dialog box informs you that the process is complete and asks you to reset your computer.

7 Remove the rescue disk from the disk drive.

8 Select Reset.

Your computer starts normally.

Repairing Data Files with File Fix

This section describes using File Fix to:

- Diagnose and repair damaged dBASE, Clipper, Excel, Lotus 1-2-3, Quattro Pro, Symphony, and WordPerfect data files
- Generate a report of repair activity for spreadsheet, dBASE, and Clipper files (no report is generated for WordPerfect files)

File Fix examines the files, rebuilds error-free copies, and recovers as much data as possible. See Chapter 17, "File Fix (FILEFIX)," for more information on repairing damged files using File Fix.

NOTE: File Fix cannot repair password-protected files because they are encrypted and require the encryption key to first allow access to them.

Repairing Spreadsheet Files

Follow the procedures in this section to diagnose and repair damaged Lotus 1-2-3, Symphony, Quattro Pro, or Excel files.

To repair a damaged spreadsheet file:

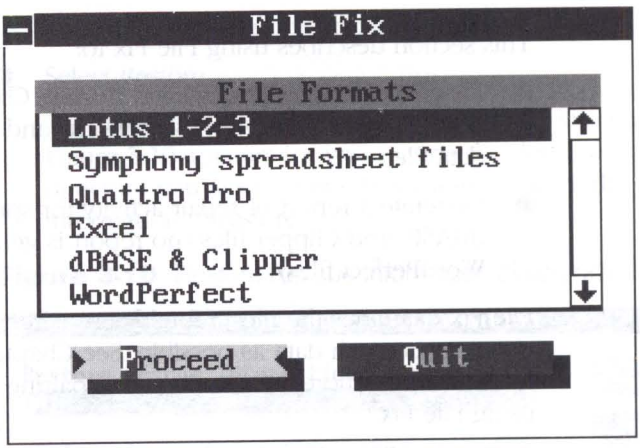
1 Choose File Fix in the Commands list on the Norton Utilities main screen.

Or,

Type `FILEFIX` at the DOS prompt.

The File Fix dialog box appears as shown in Figure 3-11. The applications that File Fix supports are listed in the dialog box.

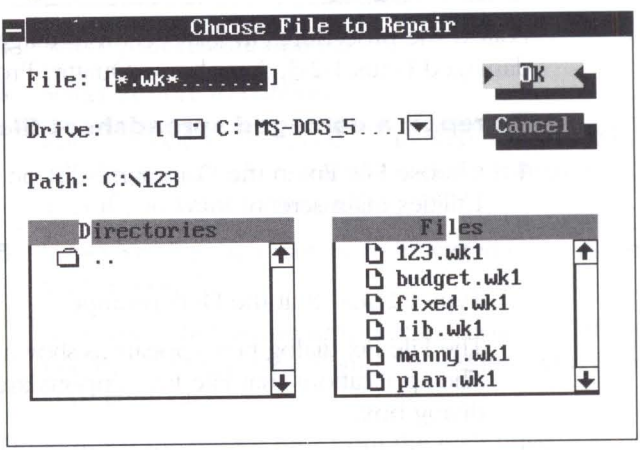
Figure 3-11 File Fix dialog box



2 Choose the appropriate spreadsheet application from the File Formats list box and select Proceed.

The Choose File to Repair dialog box shown in Figure 3-12 appears.

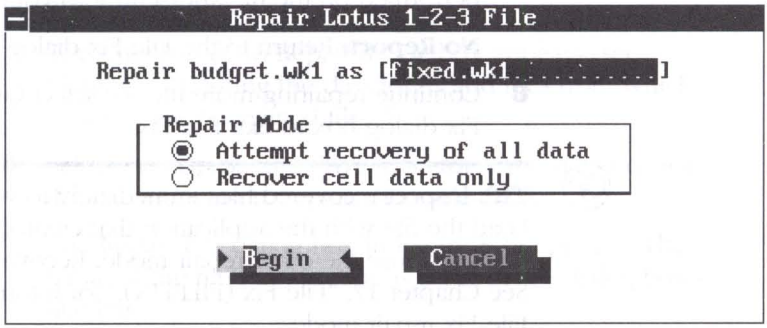
Figure 3-12 Choose File to Repair dialog box



3 Select the appropriate drive, directory, and filename for the file you want to repair, then select OK.

The Repair File dialog box shown in Figure 3-13 appears. The name of the file's application is listed in the dialog box's title bar.

Figure 3-13 Repair Lotus 1-2-3 File dialog box



4 Type a filename in the Repair As text box or keep the default name for the new, corrected file.

To write the file to another drive, add the drive letter in front of the filename.

5 Select a repair method from the Repair Mode group box. Always choose Attempt Recovery of All Data first. If this option doesn't work, try Recover Cell Data Only next.

6 Select Begin to start the repair process.

A bar graph showing the repair progress appears as the file is repaired. File Fix then displays the number of bytes recovered and the number of bytes not included in the fixed file.

If you are repairing an Excel file, File Fix prompts you to specify a location for the repair activity report before it begins repair of the file. If you are repairing a Lotus 1-2-3, Symphony, or Quattro Pro file, File Fix immediately begins repair of the file. Once the file is repaired, you are prompted to specify a location for the File Fix report.

7 When you are prompted for a report location, select one of the three command buttons to specify where to generate the report.

File: Generate a report of the corrective actions performed on the file and save it to another file.

Printer: Generate a report of the corrective actions performed on the file and send it to your printer.

No Report: Return to the File Fix dialog box.

8 Continue repairing more files or select Quit in the File Fix dialog box to exit File Fix.

TIP: Inspect recovered files immediately to verify their integrity. Load the file with the application that created it. If the file is still damaged, use the other repair mode, Recover Cell Data Only. See Chapter 17, "File Fix (FILEFIX)," for information on all the File Fix repair modes.

Repairing dBASE or Clipper Files

Follow the procedures in this section to diagnose and recover damaged dBASE or Clipper files.

NOTE: The number of database fields that File Fix can handle equals the number of fields permitted by the version of dBASE that created the file. Here are the limits for different versions:

Version	Fields
dBASE III, III+	128
dBASE IV	256
Clipper	1024

Similarly, File Fix can handle the same record size permitted by dBASE, with one exception: Clipper can generate huge records of 1024 character fields, and each field can be up to 64K in size. File Fix handles Clipper records up to 65,519 bytes (slightly below 64K).

To repair a damaged dBASE file:

1 Choose File Fix in the Commands list on the Norton Utilities main screen.

Or,

Type `FILEFIX` at the DOS prompt.

The File Fix dialog box appears (see Figure 3-11), listing the applications that File Fix supports.

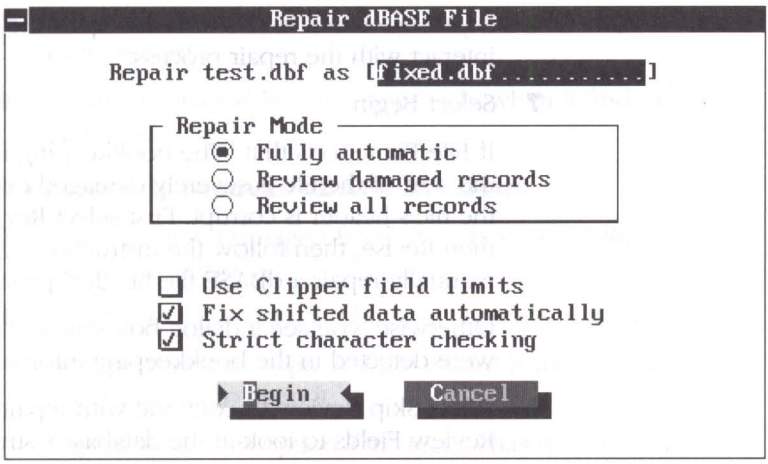
2 Choose dBASE & Clipper from the File Formats list box and select Proceed.

The Choose File to Repair dialog box appears (see Figure 3-12), listing the directories and files from which to select your damaged file.

3 Select the appropriate drive, directory, and filename for the file you want to repair, then select OK.

The Repair File dialog box in Figure 3-14 appears. The name of the file's application is listed in the dialog box's title bar.

Figure 3-14 Repair dBASE File dialog box



4 Type a filename in the Repair As text box or keep the default name for the new corrected file.

To write the file to another drive, add the drive letter in front of the filename.

5 Verify that the check boxes have the appropriate settings.

Use Clipper Field Limits: Clipper limits allow for longer character fields, more fields per record, and larger records than dBASE.

Fix Shifted Data Automatically: Checks and aligns data.

Strict Character Checking: Checks for binary characters in the text field.

6 Select a repair method from the Repair Mode group box.

Use Fully Automatic first. If this fails, try using Review Damaged Records, which is semi-automatic, or Review All Records, which is a manual repair for extremely corrupted files. For the Review All Records procedure, follow the steps in the next procedure, "To manually recover dBASE file data."

If you use either of the last two repair methods, you can interact with the repair process.

7 Select Begin.

If File Fix reports that "The bookkeeping information at the start of the file is severely damaged or missing," then the file's header is corrupt. First select Review Fields, then Revise, then follow the instructions in the "To manually repair a dBASE file header" procedure below.

Otherwise, you see a dialog box stating that no errors were detected in the bookkeeping information.

8 Select Skip Review to continue with repair process or Review Fields to look at the database's structure.

As File Fix repairs the file, a bar graph shows the repair progress. File Fix then displays the number of bytes recovered and the number of bytes not included in the fixed file.

9 When you are prompted for a report location, select one of the three command buttons to specify where to generate the report.

File: Generate a report of the corrective actions performed on the file and save it to another file.

Printer: Generate a report of the corrective actions performed on the file and send it to your printer.

No Report: Return to the File Fix dialog box.

10 Continue repairing more files or select Quit in the File Fix dialog box to exit File Fix.

TIP: Inspect recovered files immediately to verify their integrity. Load the file using dBASE or a compatible application. If the file is still damaged, use a different repair mode such as Review Damaged Records or Review All Records and follow the directions in the next procedure, "To manually recover dBASE file data."

Use the following procedure when you've already used the Fully Automatic repair mode and the file is still damaged. There are two types of manual repair:

- Review All Records stops to let you manually inspect every record.
- Review Damaged Records stops only when it finds a damaged record.

To manually recover dBASE file data:

1 Select Review Damaged Records or Review All Records as the repair mode.

2 Select one of five options when File Fix stops at a record.

Accept: Select this option if the record is mostly intact and you want to keep it.

Reject: Select this option if the record has no useful data.

Shift: Select this option if you notice that the data in all the fields seems to be shifted over. Use the arrow keys or mouse to realign the data.

Mode: Change repair modes at any point during the repair.

Cancel: Exit the repair process.

NOTE: If you get the message "Contents of field invalid" when manually repairing damaged records, the data shown may have incorrect field constraints (for example, numeric data in a character field). Fixing this file may require changing the field, changing prior fields, changing the data, or ignoring the message.

When you fix the last record, File Fix displays the number of bytes recovered and the number of bytes not included in the fixed file.

3 Proceed with Step 9 in the preceding procedure, "To repair a damaged dBASE file."

Use the following procedure to manually reconstruct the dBASE file header information when File Fix generates the message "The bookkeeping information at the start of the file is severely damaged or missing." If you have another file with identical field definitions, copy the header to the damaged file, or reconstruct the header if you have a lot of formatting information in it that you want to keep.

TIP: Use a printout of the database, if available, as a guide when manually reconstructing the header.

To manually repair a dBASE file header:

1 Select any of the recovery methods.

If the file header is damaged, you will see the error message "The bookkeeping information at the start of the file is severely damaged or missing." A dialog box asks if you want to Import a file header from another file, Edit this file header, or Cancel the repair operation. To manually repair the header, choose Edit.

2 Find the beginning of the data and select OK.

Use the LeftArrow and RightArrow keys to shift the data until the first data character from the first field aligns with the left side of the list box. Be sure that you are using actual data and not a field name. When you finish by selecting OK, the next dialog box asks you to confirm the record size.

3 Establish the size of a record and select OK.

Use the LeftArrow and RightArrow keys to shift the record size larger and smaller until the first character of data from the first field of every record aligns with the left side of the list box. All the fields must be in

alignment. When you finish by selecting OK, the next dialog box allows you to restart this record repair process or align and edit record fields.

4 Align and edit the record fields.

Use the LeftArrow and RightArrow keys to shift the record data left or right until they are aligned in each field. If you go too far, the data may wrap around to the next field. Use the UpArrow and DownArrow keys to change fields.

5 Select the Edit command button to add, delete, or change fields.

Edit specific field names and their data type for each field when all the data is in alignment.

6 Select the Restart command button to go back to the start of this repair process.

7 Select OK when you finish aligning and editing record fields to continue with the repair.

If you receive a message stating either "The sum of the field sizes does not agree..." or "The field definitions do not agree...", then the record structure may not be correct. You can select the Restart... command button or select the Revise command button in the next dialog box to return to Step 2, or you can ignore this message if you think the record structure is correct.

The next dialog box shows you the updated record structure and offers another chance to change the records with the Revise command button.

8 Select Accept when the record structure looks correct.

File Fix continues repairing the file. When it finishes, it displays a dialog box asking you what to do with the report it generated.

9 Select a destination for the report.

The File Fix dialog box appears.

10 Select Quit.

Your recovered file has the name you gave it in Step 3 of the "To repair a damaged dBASE file" procedure earlier in this chapter.

11 Use the application that created your recovered file to open and examine it.

Repairing WordPerfect Files

Follow the procedures in this section to diagnose and recover damaged WordPerfect files.

To repair a damaged WordPerfect file:

1 Choose File Fix in the Commands list on the Norton Utilities main screen.

Or,

Type `FILEFIX` at the DOS prompt.

The File Fix dialog box appears (see Figure 3-11), listing the applications that File Fix supports.

2 Choose WordPerfect from the File Formats list box and select Proceed.

The Choose File to Repair dialog box appears (see Figure 3-12), listing the directories and files from which to select your damaged file.

3 Select the appropriate drive, directory, and filename for the file you want to repair, then select OK.

The Repair WordPerfect File dialog box appears.

4 Type a filename in the Repair As text box or keep the default name for the new corrected file.

To write the file to another drive, add the drive letter in front of the filename.

5 Select a repair method from the Repair Mode group box.

Recover Document: Checks the document for errors and performs automatic corrections. Try this repair mode first; if recovery is unsuccessful, follow the instructions in the next procedure, "To repair the WordPerfect file's prefix."

Review Start of Document: Displays the Repair WordPerfect Prefix dialog box.

6 Select Begin.

If recovery is successful, a dialog box informs you when the file is repaired.

7 Select OK.

The File Fix dialog box appears.

8 Select Quit.

Open and examine your recovered file in WordPerfect. File Fix places the text "**BAD**" into the file to indicate any unrecoverable areas. Simply replace this text with the correct text or attributes to repair the damage.

If File Fix displays the "Errors detected in file prefix" error message box or you are unable to access a file after using the Recover Document repair mode, File Fix may not have detected damage in the file's prefix. In this case, follow the instructions in the following procedure to repair the file's prefix.

To repair the WordPerfect file's prefix:

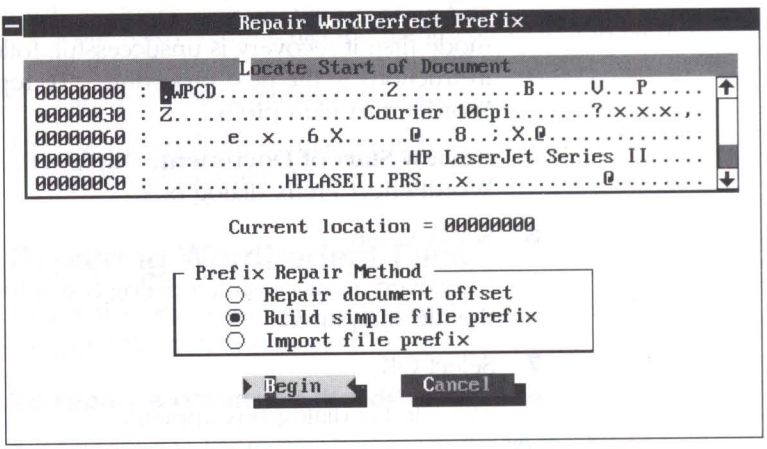
1 Select OK in the "Errors detected in file prefix" error message box.

Or,

Select the Review Start of Document repair mode in the Repair WordPerfect File dialog box, then select Begin.

The Repair WordPerfect Prefix dialog box shown in Figure 3-15 appears, with the file's prefix displayed.

Figure 3-15 Repair WordPerfect Prefix dialog box



The prefix contains a pointer to the beginning of the text in the document. In order to repair the prefix, you must provide File Fix with the correct location of the beginning of the text.

2 In the Locate Start of Document list box, position the cursor on the first character of text in the file.

3 Select a repair method from the Prefix Repair Method group box.

Build Simple File Prefix: Builds a minimal file prefix so that WordPerfect can open the file.

Repair Document Offset: Checks and sets the fifth through eighth characters of the prefix and reconnects the original prefix to the text.

Import File Prefix: Copies the prefix from another working WordPerfect file of your choice.

4 Select Begin.

A dialog box informs you of the repair based on the repair method you chose.

5 Select OK.

A dialog box informs you when the file is repaired. File Fix displays the number of bytes recovered and the number of bytes not included in the fixed file.

6 Select OK.

The File Fix dialog box appears.

7 Select Quit.

Open and examine your recovered file in WordPerfect. File Fix places the text "**BAD**" into the file to indicate any unrecoverable areas. Simply replace this text with the correct text or attributes to repair the damage.

CHAPTER

4 Prevention Tutorials

This chapter provides step-by-step instructions for preventing file and data loss. It describes:

- Using Image to save vital system information
- Protecting deleted files from being overwritten using SmartCan
- Formatting disks safely using Safe Format

Protecting Data with Image

Image saves your computer's boot record, file allocation table (FAT), and root directory information to a file named IMAGE.DAT. UnFormat and UnErase both use this file to recover your data.

To protect your data:

- Run backups regularly.
- Add the Image command to your AUTOEXEC.BAT file so that it runs every time you start your computer.
- Use Safe Format instead of the DOS FORMAT command.
- Run Image if you make significant changes to your disk.

See Chapter 20, "Image (IMAGE)," for more information on Image.

TIP: To save your disk information every time you start your computer, choose STARTUP PROGRAMS... from the Norton Utilities main screen's Configuration menu and select Save Disk Format Data to place the Image command in your AUTOEXEC.BAT file.

To run Image:

- Choose Image in the Commands list on the Norton Utilities main screen.

Or,

- Type `IMAGE` at the DOS prompt.

  To save information for another drive, specify a drive letter after the Image command; for example, `IMAGE D:`.

As Image runs, you'll see the following messages: "Updating IMAGE for drive C:..." and "Finished updating IMAGE for drive C:..." These messages appear for each drive you run Image on.

Preserving Deleted Files with SmartCan

This section describes:

- How to set up SmartCan
- How to protect network and floppy drives
- Which types of files to protect
- How to change the storage limits
- How to manually purge old stored files

See Chapter 30, "SmartCan (SMARTCAN)," for more information on SmartCan protection.

Background

Although UnErase retrieves deleted files, it may not work if you have overwritten the deleted files. SmartCan protects deleted files from being overwritten. When you use UnErase to recover a file protected by SmartCan, it is intact. By default, SmartCan only protects files on the local hard drive. The files are stored in the SMARTCAN directory by default.

Because disk space is limited, SmartCan purges the protected files after a specified number of days or when protected data reaches a specified size.

TIP: To run SmartCan every time you start your computer, choose STARTUP PROGRAMS... from the Norton Utilities main screen's Configuration menu and select SmartCan to place the command in your AUTOEXEC.BAT file.

Using SmartCan

Use these procedures to configure and enable SmartCan. The configuration options are described in the following sections.

CAUTION: Because SmartCan is a memory-resident program, you should load it and other memory-resident programs before running any application program.

To configure SmartCan:

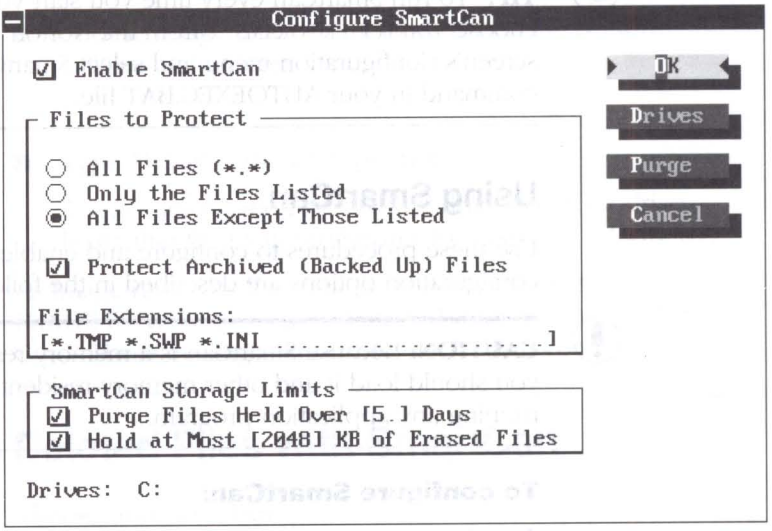
1 Choose SmartCan in the Commands list on the Norton Utilities main screen.

Or,

Type SMARTCAN at the DOS prompt.

The Configure SmartCan dialog box appears. Use this dialog box to change the files that are protected and the automatic purge criteria as described below. Figure 4-1 shows the default settings.

Figure 4-1 Configure SmartCan dialog box



2 Select your configuration options.

3 Select OK.

To enable SmartCan:

■ Check the Enable SmartCan check box.

Protecting Other Drives

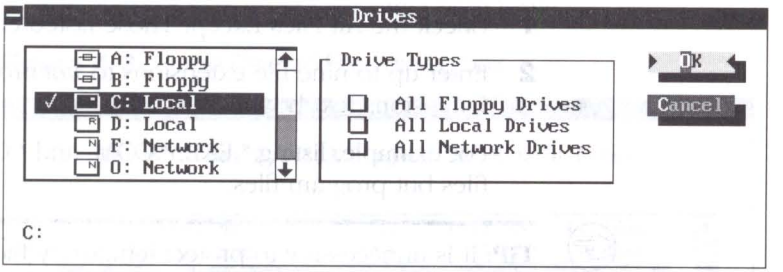
Follow this procedure to extend SmartCan protection to other drives.

To protect floppy or network drives:

1 Select the Drives command button in the Configure SmartCan dialog box.

The Drives dialog box, shown in Figure 4-2, lists the available drives.

Figure 4-2 Drives dialog box



2 Select the drives to protect.

Select individual drives in the list box or use the Drive Types group box to select All Floppy Drives, All Local Drives, or All Network Drives. Protected drives have a checkmark next to them.

3 Select OK.

NOTE: Any SmartCan options you set apply to all selected drives.

Selecting Files to Protect

Choose which types of files you want SmartCan to protect. By specifying which files to protect, you control how quickly your SMARTCAN directory will fill up, and how long older deleted files will be kept.

To protect all files:

- Check the All Files check box.

To specify which files to protect:

1 Check the Only the Files Listed check box.

2 Enter up to nine file extensions to protect in the File Extensions text box.

For example, entering *.DBF and *.DOC protects database and word processor files.

To specify which files *not* to protect:

1. Check the All Files Except Those Listed check box.
2. Enter up to nine file extensions to *not* protect in the File Extensions text box.

   For example, listing *.EXE, *.COM, and *.OVL protects all files but program files.

TIP: It is unnecessary to protect temporary files that applications create. For example, SmartCan excludes *.SWP, *.TMP, and .INI files by default. To also exclude *.BAK files, add *.BAK to the list.

To protect archived files:

- Check the Protect Archived (Backed Up) Files check box.

Changing Storage Limits

You can change the time and space criteria in the SmartCan Storage Limits group box. After the specified time or space limit expires, SmartCan purges with no warning, beginning with the oldest files.

To change the number of days that files are protected:

- Type over the default of five days with your limit.

To eliminate the time limit:

- Uncheck the Purge Files check box.

To change the space limit:

1. Check the Hold at Most check box.
2. Enter a space limit in kilobytes.

The minimum limit is 16K.

Purging Files Manually

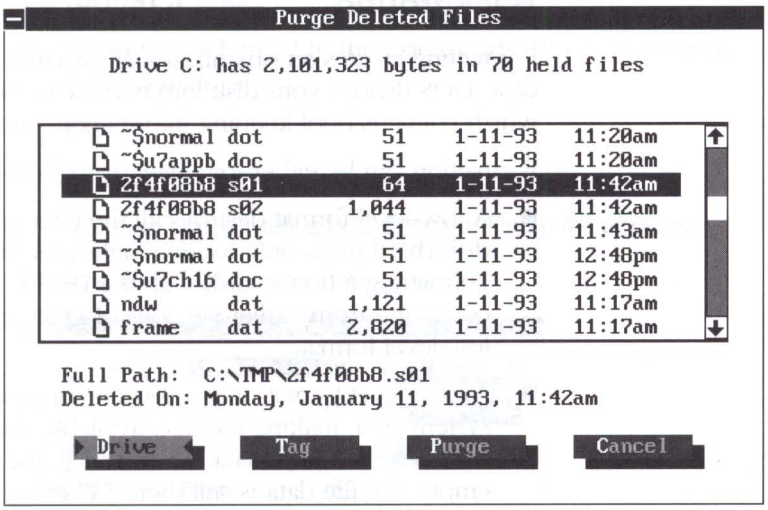
You can manually purge the files being protected by SmartCan.

To manually purge files:

1. Select the Purge command button in the Configure SmartCan dialog box.

The Purge Deleted Files dialog box shown in Figure 4-3 lists deleted files on the specified hard drive.

Figure 4-3 Purge Deleted Files dialog box


Purge Deleted Files
Drive C: has 2,101,323 bytes in 70 held files
~$normal dot 51 1-11-93 11:20am
~$u7appb doc 51 1-11-93 11:20am
2f4f08b8 s01 64 1-11-93 11:42am
2f4f08b8 s02 1,044 1-11-93 11:42am
~$normal dot 51 1-11-93 11:43am
~$normal dot 51 1-11-93 12:48pm
~$u7ch16 doc 51 1-11-93 12:48pm
ndw dat 1,121 1-11-93 11:17am
frame dat 2,820 1-11-93 11:17am
Full Path: C:\TMP\2f4f08b8.s01
Deleted On: Monday, January 11, 1993, 11:42am
Drive
Tag
Purge
Cancel

2 Mark the files to purge from the list.

To mark files, highlight the file you want to mark and press Spacebar.

Or,

Select Tag and enter a wildcard file specification.

3 Select Purge.

TIP: Examine the list of deleted files to see if any files are not necessary to save, and remove protection for these file types.

Formatting Disks with Safe Format

This section describes:

- The different levels of disk formatting
- How to perform a "safe" format
- How to use Safe Format to format hard drives

See Chapter 29, "Safe Format (SFORMAT)," for more information on formatting disks.

Background

Formatting creates an organizational structure to store data on a disk. DOS divides your disk into two areas: the system area, which contains bookkeeping information, and the data area.

Formatting can be either low-level or high-level.

- A low-level format destroys all the data on the floppy disk (hard disks only receive high-level formats). Formatting a floppy disk with the DOS FORMAT command from earlier versions of DOS only performs a low-level format.
- A high-level format only resets the information in the system area, making the disk available for new data. It does not overwrite data. Even though the disk appears empty, the file data is still there. When you format a disk with the Safe or Quick formatting mode of Safe Format, you perform a high-level format. When formatting a hard disk, you perform a high-level format.

Safe Format provides three formatting modes:

Safe Format checks the surface of the disk, marks any bad sectors, creates Image files, and reformats tracks that need to be reformatted.

Because it doesn't reformat every track, Safe Format is faster than the DOS FORMAT command and allows UnFormat to recover data.

Quick Format is faster than Safe Format. It just places a new system area on a previously formatted disk and creates Image files.

DOS Format duplicates the DOS FORMAT command using the Safe Format menu interface. It completely erases all data; you cannot recover data that existed before formatting.

Formatting a Disk

Follow the steps below to format a disk with Safe Format.

To format a disk:

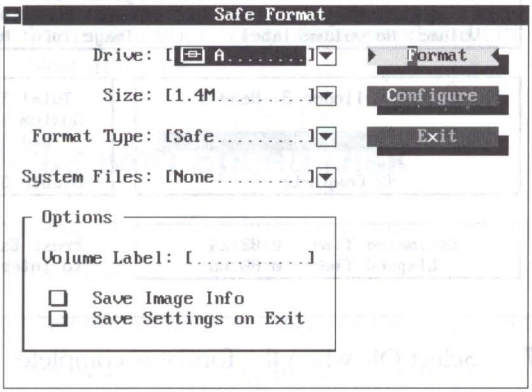
1 Choose Safe Format in the Commands list on the Norton Utilities main screen.

Or,

Type SFORMAT at the DOS prompt.

The Safe Format dialog box shown in Figure 4-4 appears.

Figure 4-4 Safe Format dialog box



2 Choose the drive you want to format.

By default, only floppy drives appear in the Drive drop-down list box. This security measure prevents accidental hard disk reformatting. To enable hard disk formatting, see Chapter 29, "Safe Format (SFORMAT)."

3 Select other options or use the default settings.

NOTE: Check the Save Image Info check box so you can restore the data with UnFormat if you accidentally format your disk with Safe Format.

4 Insert the floppy disk into the drive if you haven't already.

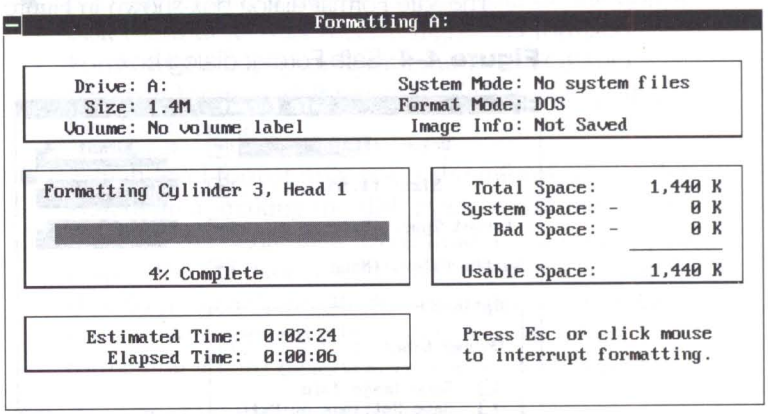
5 Select Format.

Safe Format analyzes the disk and displays a confirmation box along with any directories and files found.

6 Select Yes to continue with the format.

When you're formatting a disk, the Formatting progress screen appears as illustrated in Figure 4-5.

Figure 4-5 Safe Format in progress



7 Select OK when the format is complete.

8 Select Exit to quit Safe Format.

CHAPTER

5 Performance Tutorials

This chapter provides step-by-step instructions for enhancing your computer's performance. It describes:

- Optimizing your hard disk's performance using Speed Disk
- Increasing your computer's speed and efficiency with Norton Cache

Optimizing Disks with Speed Disk

This section describes how to optimize a disk. Use Speed Disk to:

- Defragment files
- Determine the percentage of file fragmentation on a disk
- See where files are physically located on a disk

With Speed Disk's ability to automatically recommend and perform the most appropriate method of optimization, you may never need to use the customization options available from the Speed Disk Optimize and Configure menus. You can, however, use the commands in these menus to fine-tune the way Speed Disk optimizes your disk. See Chapter 31, "Speed Disk (SPEEDISK)," for more information.

Fragmented Files

As you work with files—creating, copying, and erasing or deleting them—the files become fragmented. They get stored in "bits and pieces" all over your hard disk. Over time, this slows down your work because the computer takes longer and longer to find those pieces. Speed Disk reorganizes the physical layout

of files to defragment the pieces and consolidates all the unused data space on your disk. Optionally, Speed Disk places the most frequently accessed directories and files at the beginning of the disk. Optimizing your disk this way allows your computer to read and write data much faster.

CAUTION: It is impossible to verify beforehand that Speed Disk is compatible with every hardware and software combination. Before running Speed Disk on your computer for the first time, back up your entire hard disk. After you have verified that Speed Disk is compatible with your computer, this precaution won't be necessary again (unless, of course, you change this environment by changing hardware and adding software).

Optimizing a Disk

Speed Disk automatically tests your disk for file fragmentation and recommends an appropriate optimization method.

WARNING: Don't turn off or otherwise disable your computer while Speed Disk is running. Turning off the power any time your computer is writing to the disk can damage files. Although Speed Disk has special protection to safeguard you in case of an accidental power loss, you should not tempt fate. You can safely interrupt Speed Disk before it finishes by pressing Esc.

Also, make sure you don't have any memory-resident programs (TSRs) active that might access the disk while Speed Disk is running. For example, never use Speed Disk when a fax/modem program is waiting for a call, and disable any scheduling TSRs, screen savers, and disk caches (such as Microsoft's SMARTDrive). You don't have to worry about any Norton programs from Symantec, such as Norton Cache. Speed Disk automatically manages them.

To optimize a disk with Speed Disk:

1 Choose Speed Disk from the Commands list on the Norton Utilities main screen.

Or,

Type SPEEDISK at the DOS prompt.

Speed Disk tests system memory to make sure that data won't be corrupted during the optimization process.

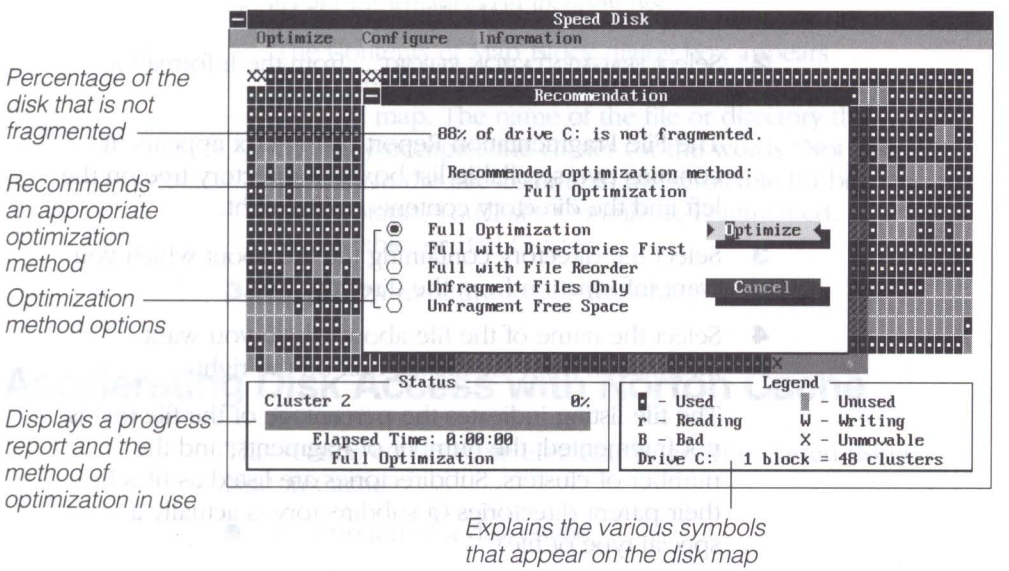
2 Select the drive you want to optimize from the drives list box.

Or,

Type the drive letter.

Speed Disk reads and analyzes the data on the selected drive. Then a map of the disk appears with the Recommendation dialog box, as illustrated in Figure 5-1. This dialog box reports the percentage of the disk that is not fragmented and recommends an appropriate optimization method.

Figure 5-1 Speed Disk Recommendation dialog box



3 Select Optimize to use the recommended optimization method.

Speed Disk updates the disk map as it works.

You can also use an optimization method other than the recommended one; simply select the appropriate option button for the method you want. See Chapter 31, "Speed Disk (SPEEDISK)," for a complete discussion of the optimization methods.

Speed Disk will also optimize compressed drives. Because Speed Disk must defragment compressed drives in two stages, be patient. The process can take some time.

Getting Information

Sometimes you may just want to see which files are badly fragmented and then make a decision to optimize your disk based on that information.

To find out which files are fragmented:

1 If you have just started Speed Disk, select Cancel when an optimization method is recommended.

2 Select FRAGMENTATION REPORT... from the Information menu.

The File Fragmentation Report dialog box appears. It contains two scrollable list boxes: a directory tree on the left and the directory contents on the right.

3 Select the directory containing the file about which you want information from the directory tree.

4 Select the name of the file about which you want information from the file list box on the right.

The file listing indicates the percentage of the file that is not fragmented, the number of fragments, and the number of clusters. Subdirectories are listed as files in their parent directories (a subdirectory is actually a special type of file).

5 Select OK to exit the File Fragmentation Report dialog box.

Other information about the selected drive is available through the DISK STATISTICS... command in the Information menu. You can find out the percentage of the disk used, the number of files, the number of clusters allocated to unmovable files, and more.

To display a Disk Statistics report:

- Choose DISK STATISTICS... from the Speed Disk Information menu.

Using the Walk Map

The Walk Map lets you discover what files occupy any block on the disk. A block represents a number of clusters on your disk. The block-to-cluster ratio varies depending upon the size of your disk and your screen resolution.

To get information about a specific block:

1. Choose WALK MAP from the Information menu.
2. Use the arrow keys to move the cursor to a block on the map and press Enter.

   If you are using a mouse, you can simply click a block to get information on its contents.

   The Contents of Map Block dialog box appears displaying the clusters represented by one character of the disk map. The name of the file or directory that currently occupies the cluster (or the words "Not Used") appears in the File column in the scrollable list box. Under Status, you'll see Optimized, Fragmented, Unmovable, or Bad Cluster.
3. Select OK to return to the Walk Map.

Accelerating Disk Access with Norton Cache

This section covers three elements to get you started using Norton Cache:

- Description of a disk cache
- Installation locations and methods
- Installation instructions

For more detailed information on Norton Cache, see Chapter 22, "Norton Cache (NCACHE2)."

Overview of Norton Cache

Norton Cache helps your computer work faster by using memory to hold data read from and written to disks. Since computers read and write to memory much faster than to disk, a cache speeds up both of these operations noticeably.

Norton Cache is a read-ahead, write-back cache that is completely configurable and compatible with both DOS and Windows. Norton Cache multitasks disk writes in the background while you perform other tasks in the foreground, increasing input/output speed even more. The benefit of disk caching is illustrated below.

Storage Type	Access Time (milliseconds)
Memory	0.000007 to 0.000008
Hard disk	9 to 25
Floppy disk	200

Once installed, Norton Cache works automatically.

Installing Norton Cache

To install Norton Cache every time your computer starts, place the command into one of two startup files: AUTOEXEC.BAT or CONFIG.SYS. Table 5-1 compares the advantages and disadvantages of both startup files.

Table 5-1 Norton Cache installation locations

Location	Advantages	Disadvantages
AUTOEXEC.BAT	Installs as a TSR, which is removable from memory if it's the last TSR loaded	Does not speed up boot process
CONFIG.SYS	Speeds the boot process	Norton Cache not removable without changing CONFIG.SYS and restarting the computer
		Can't load into high memory when using DOS=UMB

You also have two methods of installation: using the Norton Utilities Configuration (NUCONFIG) program, or editing one of your startup files with a text editor. You can install it using only one of these methods. Table 5-2 compares the advantages and disadvantages of both installation methods.

Table 5-2 Comparison of installation methods

Method	Advantages	Disadvantages
Use Norton Utilities Configuration program	Easy Shows defaults Control common switches	Can't control all switches
Insert directly with text editor	Control all switches	Need to understand command syntax

NOTE: If you use expanded memory, Norton Cache requires a Lotus-Intel-Microsoft (LIM) 4.0-compatible Expanded Memory (EMS) manager.

Installing with Norton Utilities Configuration

Folllow this procedure to install Norton Cache using Norton Utilities Configuration.

To install Norton Cache using Norton Utilities Configuration:

1 Choose Configuration from the Commands list on the Norton Utilities main screen.

Or,

Type `NUCONFIG` at the DOS prompt.

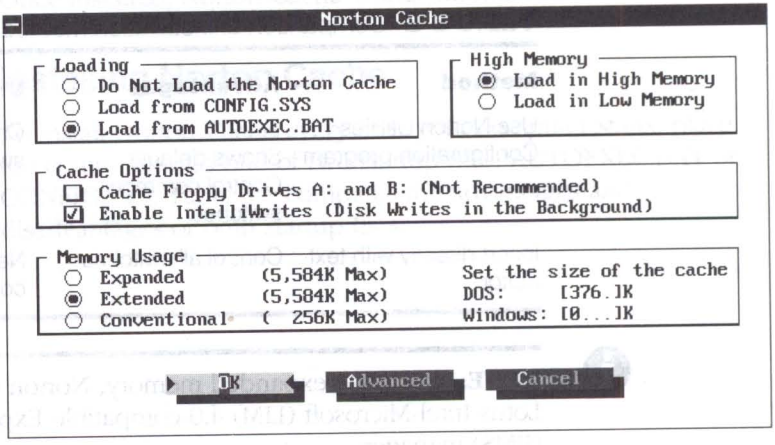
The Configure Norton Utilities dialog box appears.

2 Select Startup Programs.

3 Highlight Start Norton Cache in the Startup Programs list box and select the Configure command button.

The Norton Cache dialog box shown in Figure 5-2 appears. Note that the settings on your Norton Cache configuration may be different than shown here.

Figure 5-2 Norton Cache dialog box



4 Make the necessary adjustments.

The default settings work well for most systems. However, you must choose a startup file from the Loading group box; the options are described after this procedure.

5 Select OK to exit the Norton Cache dialog box.

6 Select Save to save your settings and exit the Startup Programs dialog box. The following actions are performed:

- Any preexisting cache installation command (such as SMARTDRV) is remarked out of the startup file you selected.
- The Norton Cache installation command is put at the end of the startup file you selected.
- The NCACHE.INI file is created to store and use your settings.

7 Select Quit to exit Norton Utilities Configuration.

8 Reboot your computer to start Norton Cache.

The Norton Cache dialog box contains the following option group boxes:

Loading: Select the file, AUTOEXEC.BAT or CONFIG.SYS, where you want to place the installation command.

Select Do Not Load the Norton Cache if you don't want Norton Cache installed at startup. You can install it after startup using the /INSTALL command-line switch; see Chapter 22, "Norton Cache (NCACHE2)," for an explanation of Norton Cache command-line switches.

High Memory: Select Load In High Memory to allow Norton Cache to use any memory above 640K. Using high memory leaves the conventional memory available for DOS applications.

Cache Options: Select the caching options you want to use.

Caching floppy drives can provide dramatic speed improvements, but is not recommended unless you perform frequent input/output to the floppy drives without exchanging disks. If you cache floppy drives, wait to remove a disk until the cache finishes writing to the floppy disk (at least as long as the delay setting in the Advanced dialog box) or you might remove a disk before your files are properly saved.

Enabling IntelliWrites reduces head movement for each rotation when writing to disk. Also, IntelliWrites provide simultaneous disk writing and program execution (multitasking).

Memory Usage: Select the memory options appropriate for your configuration. Norton Utilities Configuration shows the available memory for the cache. Norton Cache selects default cache sizes based on the available space. Generally these defaults are appropriate. Listed below are some considerations when overriding the defaults.

- If you use applications (other than Windows) that use memory over 1 MB, reduce the available memory.
- Make the Norton Cache size between 1 MB to 2 MB when running under Windows 3.x.
- An efficient cache for most systems is between 1 MB to 2 MB of extended memory or expanded memory. If you have over 6 MB of unused memory or frequently use files of more than 2 MB, you may benefit from a larger cache.

Advanced Options: See Chapter 22, "Norton Cache (NCACHE2)," for more information about customizing advanced options.

Installing with a Text Editor

If you use a text editor to modify your CONFIG.SYS or AUTOEXEC.BAT file, you must manually set the Norton Cache command-line switches. You control Norton Cache with three types of switches:

Install Switches: Install Norton Cache. You can only change them by reinstalling Norton Cache.

Reconfigure Switches: Modify Norton Cache after installation. However, seven of the reconfigure switches (/DELAY, /QUICK, /MULTI, /QUIET, /STATUS, /DISKRESET, and /REPORT) can also modify Norton Cache during installation.

Drive Switches: Modify Norton Cache for the drives you specify during and after installation.

You must use at least one of the following switches to perform the installation: /INSTALL, /EXT, or /EXP. Without one of these switches, Norton Cache returns to the DOS command prompt and displays the "Norton Cache is NOT installed" message.

The following procedure will get you started. See Chapter 22, "Norton Cache (NCACHE2)," for detailed information about each Norton Cache command-line switch.

NOTE: If you modify a startup file with a word processor, you must save the file as a simple text file. If you do a normal save, the word processor puts non-ASCII characters in the startup file readable only by that word processor but not by DOS.

To edit a startup file:

1. Open one of the startup files using a text editor or word processor that can create ASCII files.
2. Place the following command with your choice of switches at the end of your AUTOEXEC.BAT file:

```
path\NCACHE2 [install switches]
  [reconfigure switches] [[drive:]
  [drive switches]]
```

   Or,

   Place the following command with your choice of switches at the end of your CONFIG.SYS file:

```
DEVICE=path\NCACHE2 [install switches]
  [reconfigure switches] [[drive: ]
  [drive switches]]
```

TIP: When editing AUTOEXEC.BAT, do not place the Norton Cache command after a line that runs a batch file or menu program because it may not return to AUTOEXEC.BAT. If you ever need to uninstall Norton Cache, install it as the last terminate-and-stay-resident (TSR) program. Otherwise, you must uninstall TSRs installed after it or restart the system without Norton Cache because TSRs go into memory in a first-in-last-out order. When editing CONFIG.SYS, make Norton Cache the last device in this file for better compatibility with the other device drivers.

3. Save the file.
4. Exit the the text editor.
5. Reboot your computer to start Norton Cache.

PART

III Reference

This part of the *Norton Utilities User's Guide* provides complete reference information on each of the utilities. The utilities are organized alphabetically so you can find them easily, with each program name followed by its executable filename.

CHAPTER

6 Batch Enhancer (BE)

This chapter describes using Batch Enhancer to improve your batch files, including:

- The features Batch Enhancer offers
- Using Batch Enhancer commands in DOS batch files and Batch Enhancer script files
- The syntax and switches for each Batch Enhancer command

What It Does

Batch Enhancer (BE) provides extensions to DOS batch facilities and a script facility, including these features:

- Interactive batch processing
- Graphics and sound capabilities
- Date-based processing
- Conditional branching in batch files

When to Use It

Use Batch Enhancer to create menus, add flexibility to AUTOEXEC.BAT tasks, automate commonly used command sequences, and draw custom screens.

How to Use It

Choose Batch Enhancer from the Norton Utilities main screen and type a BE subcommand after the BE command. Alternatively, type BE followed by a BE subcommand at the DOS prompt. The syntax for BE is:

BE subcommand [parameters]

BE pathname [[GOTO] label]

where "subcommand" is one of the BE subcommands, "parameters" are BE command parameters and switches, "pathname" is a BE script file, and "label" is a label in a BE script file. Each of the components of the BE syntax are described in detail later in this chapter.

For example, to draw a red window with a see-through shadow, type:

```
BE WINDOW 10,10,20,40,red shadow
```

You can use any Batch Enhancer subcommand in DOS batch files by typing BE followed by the subcommand.

Using Script Files

When you use script files, Batch Enhancer executes the subcommands directly, rather than through DOS, which greatly increases execution speed.

You can use any Batch Enhancer subcommand in a script file, but DOS commands in script files are ignored. Because Batch Enhancer directly executes subcommands in the script files, the letters "BE" that normally begin a Batch Enhancer command line are optional.

Create script files with any text editor or word processor that creates ASCII text files. To execute a script file, use the following syntax:

BE pathname [[GOTO] label]

Batch Enhancer searches your PATH to locate the script file specified by the pathname if it is not in the current directory. The GOTO command and the label specify the location in the

script file at which to start execution. For more information, see the "GOTO" section later in this chapter.

Batch Enhancer Subcommands

This section provides a reference to the Batch Enhancer subcommands.

ASK

Prompts with a question and waits for a response to determine how the batch file should proceed. Use ASK to create interactive batch files. The syntax is:

BE ASK "prompt" [key-list] [DEFAULT=key] [TIMEOUT=n] [ADJUST=n] [color] [/DEBUG]

"prompt"	Question displayed by ASK. Place quotation marks around the text of the question.
key-list	Optional list of keys you can type as the response. When no key-list is given, you press any key to continue and ASK returns that key's ASCII code. The response is case-insensitive.
DEFAULT=key	Key returned if you do not enter a key in the time-out period or if you press Enter.
TIMEOUT=n	Time in seconds before returning the default key. If *n* is zero or no TIMEOUT is specified, ASK waits forever. Maximum value is 65,535.
ADJUST=n	Adds *n* to the returned value. Used to test multi-layered menus in one pass. Maximum value is 254.
color	Optional SA format color specification (see SA) for setting the prompt display color.
/DEBUG	Displays the returned value.

To respond to ASK, type a key from the key-list. ASK doesn't display the key-list itself, so use the prompt to indicate possible responses and explain their results.

ASK returns an errorlevel code based on the key chosen from the key-list. The first key in the key-list results in errorlevel 1, the second in errorlevel 2, the third in 3, and so on. The batch program can then branch to different labels in the file based on the errorlevel.

When using batch file errorlevel codes, you must list the "if errorlevel n goto label" statements in descending order. Practically speaking, start listing these statements with the rightmost key in the key-list, and proceed in order to the leftmost key. For example, to use the following prompt to branch execution:

```
Run the (E)ditor, (D)atabase, or (Q)uit?
```

you might create a batch file like this:

```
@echo off
BE ASK "Run the (E)ditor, (D)atabase, or
(Q)uit?", edq
   if errorlevel 3 goto quit
   if errorlevel 2 goto database
   if errorlevel 1 goto editor
REM    The previous line is not really
REM    necessary, since the editor
REM    commands follow immediately
:editor
   edit.exe
   goto quit
:database
   cd \progs\db
   db.exe
   goto quit
```

```
REM    The previous line is redundant
:quit
```

In this example, ASK returns one of three errorlevel codes: 1 for the first key in the key-list, e; 2 for the second key, d; and 3 for the third key, q. Immediately after the ASK command, three statements check the errorlevels in decending order to branch execution.

BEEP

Plays tones of the specified frequency and duration on the computer's speaker. You can specify a single tone on the command line or a series of tones in a file.

TIP: Use BEEP in a batch file to signal progress, unusual conditions, or the end of the file.

The syntax for BEEP is:

BE BEEP [/Dn] [/Fn] [/Rn] [/Wn]

BE BEEP script-file [/E]

/Dn	Duration of the tone in *n*/18 of a second.
/Fn	Frequency of the tone in cycles per second (Hertz).
/Rn	Number of times to repeat the tone.
/Wn	Time to wait between tones in *n*/18 of a second.
/E	Echo the quoted text in comments. Hyphens are not displayed.

You can enter switches in any order. Use BEEP with no switches for the computer's standard tone.

BEEP plays the tones in a tone file, a special form of script file, as if you had entered them on the command line, one line at a time, so you can easily create music.

In a tone file, don't enter the BEEP command itself. In addition, the forward slash (/) used for switches is optional. Following the switches, you can add comments beginning with a semicolon. To display text in quotation marks in the comments as the tones

play, specify the /E switch. For example, the tone produced by the command line:

```
BE BEEP /F440 /D36 /R3 /W18
```

could be duplicated in a tone file with a displayed comment using this line:

```
F440 D36 R3 W18; This is the "sol" note/E
```

This line plays a 440 Hertz tone for two seconds (36/18 of a second), waits 1 second (18/18 of a second), and displays the word "sol" on the screen. The sequence repeats three times.

The following tone file plays a two-second, 330 Hertz tone three times, waiting one second between each repeat, and then plays a 660 Hertz tone for one second:

```
; A two line tonefile
F330 D36 R3 W18
F660 D18
```

If you stored these lines in a file called TONEFILE, you play them by typing `BE BEEP tonefile` at the DOS prompt.

BOX

Draws a rectangle of a specified size and color at any location with a single- or double-line border. Boxes are not filled; only text under the border is overwritten. The syntax is:

BE BOX top left bottom right [SINGLE | DOUBLE] [color]

top	Row for upper-left corner.
left	Column for upper-left corner.
bottom	Row for lower-right corner.
right	Column for lower-right corner.
SINGLE	Single-line outline.
DOUBLE	Double-line outline, the default.
color	SA format color specification (see SA).

CLS

Clears the screen with an optional color specification. Set color attributes with CLS before commands (like ROWCOL, ASK, and BOX) that default to existing color attributes to make them smaller and faster. The syntax is:

BE CLS [color]

color	SA format color specification (see SA).

BE CLS works like BE SA /CLS except that CLS calls the BIOS clear screen function directly, while SA goes through the ANSI.SYS driver. You can use CLS even if you haven't installed ANSI.SYS.

DELAY

Pauses execution of a batch file for a specified number of clock ticks (each tick is 1/18 of a second). The batch file continues when the time has elapsed. The syntax is:

BE DELAY ticks

ticks	number of clock ticks (1/18 second) to pause.

EXIT

Terminates script file execution, providing variable exit points. Use GOTO and EXIT for selective execution of a script file. You can set up several different scripts in one file, independent of each other. The syntax is:

BE EXIT

EXIT only appears in script files; it has no meaning executed directly from DOS.

GOTO

Controls the starting point in a script file, providing selective execution.

Unlike the DOS GOTO command, GOTO works only in script files. The conventions for labels are the same as DOS GOTO; labels must start with a colon (:) and exist on their own line starting at column 1.

GOTO varies the execution starting point, unlike JUMP which provides conditional branching.

The syntax for GOTO is:

BE pathname [[GOTO] label]

pathname	A Batch Enhancer script file.
label	A label existing in a script file.

The GOTO token is optional as long as the label is defined after the script file name.

JUMP

Provides conditional branching in script files based on the previous command's errorlevel code. JUMP only appears in script files; it has no meaning executed directly from DOS.

Script files contain only Batch Enhancer commands and ignore DOS commands, so JUMP is the only way to branch execution.

To use JUMP, specify a series of labels. The errorlevel code of the command preceding JUMP provides an offset into the label series, and execution continues at the appropriate label. Errorlevel 1 selects the first label, 2 selects the second label, and so on. An errorlevel of zero or greater than the number of labels continues execution at the default label. With no default label, execution continues at the next script file line.

The syntax for JUMP is:

JUMP label1 [, label2 [, ..., labeln]] [/DEFAULT:label]

label	A valid label in the script file.
/DEFAULT:label	The label to select if the errorlevel is zero or greater than the number of labels.

MONTHDAY

Determines the day of the month (1–31) and returns it as an errorlevel code. Use this errorlevel code with the DOS IF ERRORLEVEL command or with BE JUMP in a script file to branch execution. The syntax is:

BE MONTHDAY [/DEBUG]

/DEBUG	Display the errorlevel value returned.

PRINTCHAR

Displays a specified character a given number of times at the current cursor location using the optional color specification. The syntax is:

BE PRINTCHAR character, count [color]

character	Character to display.
count	Number of times to display the character (up to 80).
color	SA format color specification (see SA).

REBOOT

Performs a warm boot from a batch file, which is useful in batch files affecting system configuration. An optional switch prompts before rebooting. The syntax is:

BE REBOOT [/VERIFY]

/VERIFY	Prompt to confirm the reboot.

ROWCOL

Positions the cursor at a specific row and column. The next command displaying text places it at that location. ROWCOL can also display a text line with an optional color specification.

BE ROWCOL row col ["text"] [color]

row	Row to move the cursor to.
col	Column to move the cursor to.
"text"	Optional line of text to display. Place quotation marks around the text.
color	SA format color specification (see SA). By default, the current screen colors are used.

SA (Screen Attributes)

Controls color and other screen attributes using the ANSI.SYS driver. If the screen can display them, DOS always uses the attributes you set with SA.

NOTE: You can also use Norton Control Center (NCC) to set DOS colors. For information on NCC, see Chapter 24, "Norton Control Center (NCC)."

Use SA to set attributes for your work environment and to call attention to situations during batch execution. Use distinctive settings, such as reverse video or blinking, or use SA with BEEP for video and audio cues to advise you of special circumstances.

To have your color choice in SA remain in effect, you must first install the ANSI.SYS driver. ANSI.SYS comes on your DOS program disk. Several other Batch Enhancer commands use the same format as SA to specify colors, but do not go through ANSI.SYS.

Some versions of DOS automatically install the ANSI.SYS driver for you, but with most versions, you install it yourself. To see if ANSI.SYS is installed, type `BE SA NORMAL` at the DOS prompt. If you see a message stating that ANSI.SYS is required, then it isn't installed.

To install ANSI.SYS, copy ANSI.SYS from your DOS program disk to your root directory. Then, add the line `DEVICE=ANSI.SYS` to your CONFIG.SYS file. If CONFIG.SYS doesn't already exist, create it in your root directory and put the above line in it. Reboot your computer. The line in CONFIG.SYS installs ANSI.SYS each time you boot.

With ANSI.SYS installed, you can use SA with the following syntax:

SA NORMAL | UNDERLINE | REVERSE | BOLD [/N]

SA [BRIGHT | BLINKING] foreground [ON background] [/N] [/CLS]

NORMAL	Undo an underline, reverse, or bold setting.

UNDERLINE	Only available on monochrome displays (appears as a blue foreground on color displays).
REVERSE	Switch foreground and background colors.
BOLD	Set display to bold characters.
foreground	Set foreground color to white, black, red, magenta, blue, green, cyan, or yellow. Specifying colors other than black or white has no effect on monochrome displays.
background	Set background color to white, black, red, magenta, blue, green, cyan, or yellow. Specifying colors other than black or white has no effect on monochrome displays.
/N	Do not set the border color, which defaults to the background color.
/CLS	Clear the screen after setting attributes.

For programs that set attributes and don't reset them upon exiting, a batch file like this automatically resets them:

```
program.exe
BE SA bright white on blue
```

where `program.exe` is the name of the program that does not reset attributes.

Results with SA vary, so experiment with combinations. Table 6-1 has a few examples.

Table 6-1 Sample SA settings

Result	Command
Yellow characters on blue background	BE SA bright yellow on blue
Bold characters	BE SA bold
Reverse video	BE SA reverse

SHIFTSTATE

Returns an errorlevel code indicating status of the left and right Shift keys, the Alt key, and the Ctrl key. SHIFTSTATE detects each key individually, so you can determine if one or more keys are pressed. Use with the DOS IF ERRORLEVEL or BE JUMP commands to branch execution. The syntax is:

BE SHIFTSTATE [/DEBUG]

/DEBUG	Display the errorlevel value returned.

SHIFTSTATE returns the following errorlevels, which you add together for multiple keys:

1 Right Shift key

2 Left Shift key

3 Ctrl key (left or right)

4 Alt key (left or right)

TRIGGER

Halts execution until the specified time. Use TRIGGER to display reminder messages or run batch files unattended. The syntax is:

BE TRIGGER hh:mm [AM | PM]

hh:mm	Time in 24-hour format (0:00 to 23:59).
AM | PM	Optionally specify time in 12-hour format.

12:00 (AM) means 0:00, or midnight; 12:00 (PM) is noon.

WEEKDAY

Returns the day of the week (Sunday through Saturday) as an errorlevel code. Sunday returns 1, and Saturday returns 7. Use with the DOS IF ERRORLEVEL or BE JUMP commands to branch execution. The syntax is:

BE WEEKDAY [/DEBUG]

/DEBUG	Display the errorlevel value returned.

WINDOW

Draws a rectangle of a specified size at any location with an optional drop shadow or zooming effect and a single- or double-line border. There are two differences between WINDOW and BOX:

- Windows are solid filled, overwriting any text in the window.
- Windows offer zooming or drop shadows.

The syntax for WINDOW is:

BE WINDOW top left bottom right [color] [SINGLE | DOUBLE] [ZOOM | EXPLODE] [SHADOW]

top	Row for upper-left corner.
left	Column for upper-left corner.
bottom	Row for lower-right corner.
right	Column for lower-right corner.
color	SA format color specification (see SA).
SINGLE	Single-line outline.
DOUBLE	Double-line outline, the default.
ZOOM	Zoom the window while drawing it (EXPLODE is a synonym).
SHADOW	Add a transparent drop shadow.

CHAPTER

7 Calibrate (CALIBRAT)

This chapter describes using Calibrate to test and optimize your hard disk. This chapter describes:

- The features Calibrate offers
- Compatibility issues when using Calibrate
- The tests Calibrate performs

What It Does

Calibrate (CALIBRAT) improves hard disk reliability and speed. Calibrate:

- Evaluates a hard disk's interleave and performs a non-destructive low-level format using the optimum interleave or an interleave you select.
- Tests the read/write integrity of every sector on a hard disk. Calibrate marks sectors that fail the test as bad and moves the data stored in them to good sectors.
- Reports the test results.

Before using Calibrate see Appendix A, "Disk Companion," to familiarize yourself with disk operation concepts.

When to Use It

Use Calibrate to change a disk's interleave to the optimum setting. This is usually a one-time operation. You can also use it to improve reliability if you experience errors reading from or writing to your disk.

Use Calibrate to correct worsening hard disk data storage problems before they become severe. Run Calibrate about every three months for this purpose.

Compatibility

Calibrate only tests and performs low-level formatting on physical drive partitions. It does not perform low-level formatting or pattern testing of device-driven drives, file servers, floppy disk drives, network drives, RAM drives, ASSIGNed drives, or SUBSTituted drives.

In addition, Calibrate pattern tests but does not perform low-level formatting on the following types of drives:

- Drives with "sector translating controllers," where the controller reports a different number of sectors than measured by Calibrate (for example, these controllers make it appear that there are 17 sectors per track on a hard disk when there may be 26 or more). Many ESDI drives are of this type.
- Drives with controllers that do not allow low-level formatting, such as SCSI or IDE controllers.
- Drives that are not 100-percent IBM compatible.
- Drives with controllers that have an on-board disk cache.

Most newer drives do not require low-level formatting or interleave modification.

NOTE: To give Calibrate as much memory as possible and avoid software conflicts, boot from a floppy disk with the DOS system files and a CONFIG.SYS file containing minimal device declarations before running Calibrate. This way, you can avoid using memory for unneeded terminate-and-stay-resident (TSR) programs and device drivers.

How to Use It

Choose Calibrate from the Norton Utilities main screen or type `CALIBRAT` at the DOS prompt. You can specify a drive letter following the command name on the Norton Utilities main screen or the command line. For more information on using Calibrate from the command line, See Appendix C, "Command Line Reference."

When you start Calibrate, a summary screen appears. If you have not run Calibrate before, an alert box appears when you select Continue recommending that you back up your hard disk before continuing.

WARNING: Calibrate makes every effort to be compatible with every disk drive. As a precaution, however, back up your hard disk before running Calibrate for the first time for the following reasons:

- Calibrate works at a very low level and is very hardware- and software-dependent. Backing up the first time you use Calibrate protects your data until you verify that Calibrate is compatible with your equipment.
- Calibrate stores data in the hard disk's diagnostic cylinder during pattern testing, destroying any information already stored there. Some diagnostic and "calibration" software that rely on data stored there may fail. You can use Disk Editor to copy any data from the diagnostic cylinder to another file on your disk, so you can copy it back to the diagnostic cylinder later. For more information on using Disk Editor, see Chapter 9, "Disk Editor (DISKEDIT)."

Once you have confirmed that Calibrate is compatible with your equipment, you don't need to back up and restore data to change the interleave. Even a power outage during the low-level format does not cause any data loss. Simply resume Calibrate to restore your disk to its previous state.

The Select Drive dialog box appears listing your physical disk partitions, unless you have only one hard drive partition or specify a drive letter when starting Calibrate. In these cases, Calibrate goes directly to the test description screen.

To specify the drive you want to run Calibrate on:

Select a drive and select OK. The test description screen appears.

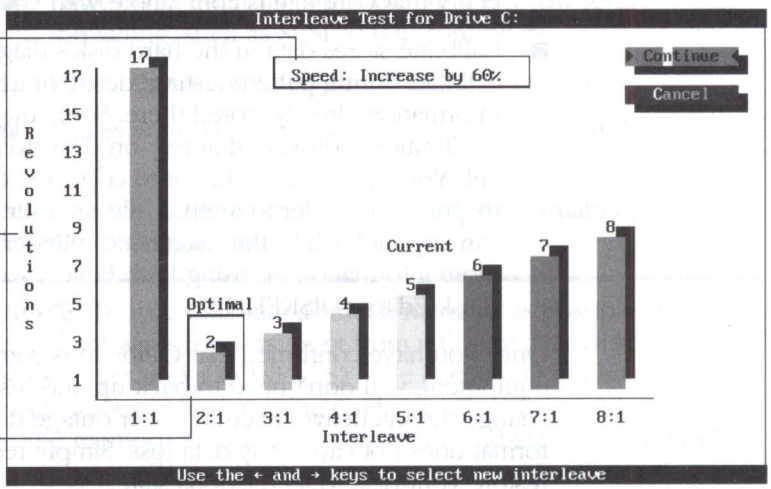
To start the tests:

Select Continue. Calibrate tests to make sure key components of your system operate correctly and are compatible with Calibrate. During each test, Calibrate displays a description and status for the test.

Once the test completes, select Continue to start the next test. After the tests, Calibrate displays an interleave chart to indicate that it can perform a low-level format and adjust the disk's interleave during pattern testing. If Calibrate cannot perform a low-level format, it displays a message and you select OK to proceed directly to the pattern test.

The Interleave bar chart shows the efficiency of different interleave settings, specifying current and optimum settings as shown in Figure 7-1.

Figure 7-1 Sample interleave report with recommended setting



The effect of the optimal setting on disk access speed

Number of revolutions required for the disk head to read an entire track

Represents the optimal setting

To change the interleave setting and start pattern testing:

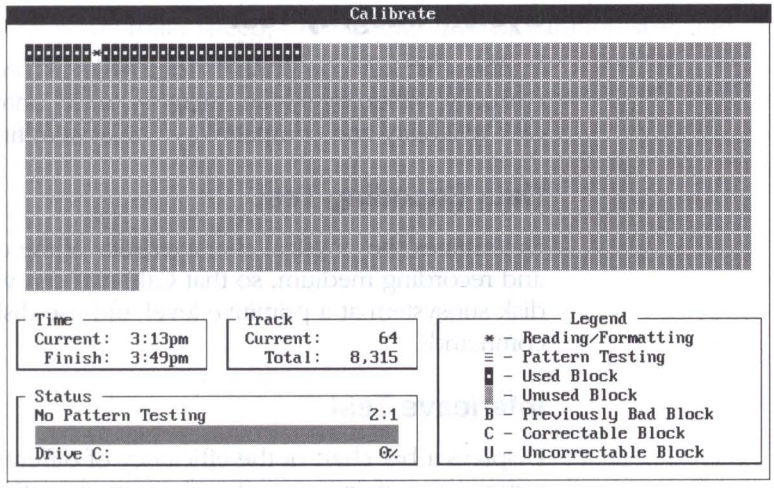
Move the box to the bar representing the setting you want and select OK. If you select a new interleave, the message at the top

center of the screen changes to reflect the increase or decrease in speed. Low-level formatting takes place during pattern testing.

When the Pattern Testing dialog box appears, select the level of pattern testing and select OK. To simply adjust the disk interleave, select No Pattern Testing, which performs a read-and-write test. For more in-depth testing, you can write up to 80 bit patterns to each sector. The more patterns you choose, the longer the testing takes (up to several hours for 80 patterns on a large disk).

Calibrate begins pattern testing and displays a disk test map (Figure 7-2) with current and estimated finish times so you can monitor progress. Calibrate dynamically updates the estimated finish time, which becomes more accurate as testing progresses.

Figure 7-2



NOTE: Since Calibrate performs non-destructive functions, you can interrupt Calibrate by pressing the Esc key or clicking any mouse button with no risk to your disk or data. The next time you run Calibrate, you can resume pattern testing where it left off.

During pattern testing, press the Spacebar to blank the screen. A dialog shows the pattern testing's progress. To return to the pattern testing screen, press the Spacebar again.

When the tests complete, Calibrate displays a test summary. Select OK to see a detailed report of pattern testing results. A dialog box appears containing the report. The report is long, so use the arrow keys and PageUp and PageDown to scroll through it.

Select Save As and enter a filename to save the report to a file, select Print to print the report, or select Done to return to the Select Drive dialog box.

To quit, select Cancel in the Select Drive dialog box.

Calibrate Reference

This section summarizes the tests and other functions Calibrate performs.

System Integrity Test

Verifies that key components for low-level formatting operate correctly, including system memory, disk controller memory, disk reliability and compatibility, the system timer, and CMOS.

Data Encoding Test

Determines the physical characteristics of the disk controller and recording medium, so that Calibrate can work with the disk subsystem at a primitive level and use disk controller commands.

Interleave Test

Displays a bar chart of the efficiency of different interleave settings, specifying current and optimum settings. The box indicates the currently selected setting.

Displaying the interleave chart indicates that Calibrate can perform a low-level format and adjust the disk's interleave during pattern testing. If Calibrate determines that it cannot perform a low-level format, it displays a message.

Pattern Test

Tests the reliability of your disk. In the Pattern Testing dialog box, choose the level of pattern testing. If you selected a new interleave, low-level formatting takes place during pattern testing.

Pattern testing writes a series of the most difficult bit patterns for the disk system to read and write reliably to every sector of the disk, one track at a time. The following levels are available:

- No Pattern Testing performs a read-and-write test. Select this option to simply adjust the disk interleave.
- Minimal pattern testing writes 5 patterns.
- Standard pattern testing writes 40 patterns.
- Rigorous pattern testing writes 80 patterns.

Disk controller speed, CPU speed, drive or partition size, and level of testing determine testing time. The more patterns you choose, the longer the testing takes (up to several hours for 80 patterns on a large disk).

CHAPTER

8 Directory Sort (DS)

This chapter explains how to use Directory Sort, including:

- The attributes or keys that you can use to sort your files
- The different modes of Directory Sort
- The capabilities of Directory Sort
- The keys to use for the main screen operations

What It Does

Directory Sort (DS) sorts files and directories by name, extension, date, time, size, or any combination. In full-screen mode, you can interactively sort and move the names of individual files, groups of files, or subdirectories to any location in the directory list.

When you sort a directory, subdirectories appear first followed by files. You cannot move files with hidden or system attributes because certain copy-protected applications depend on always finding these files in the same place.

NOTE: Directory Sort reads directories on assigned, network, or substituted disks. Directory Sort does not write changes to these disks.

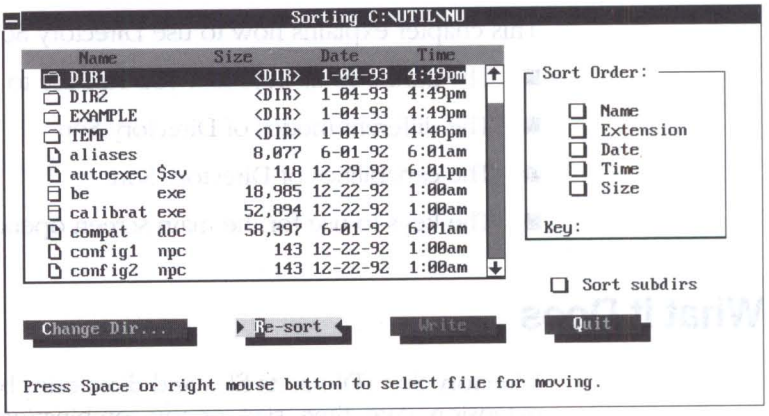
When to Use It

Use Directory Sort to sort directories and files by their keys or in your own order. Sorting directories and files makes them easier to read and locate. Also, you can use Directory Sort to place frequently accessed files first in their directories.

How to Use It

Choose Directory Sort from the Norton Utilities main screen or type DS at the DOS prompt. The dialog box in Figure 8-1 appears.

Figure 8-1 Directory Sort dialog box



You can also specify a directory and the sort criteria on the command line. You must specify at least one sort key: N for name, E for extension, D for date, T for time, or S for size. See Appendix C, "Command Line Reference," for more information on using Directory Sort from the command line.

Use the Directory Sort dialog box to move individual files. This way, you can customize your directory sorting in ways not possible from the command line.

Table 8-1 lists the sort keys and functions that you use to sort the file list. You can move subdirectories in the same way as files.

Table 8-1 Directory Sort navigation keys

Key	Function
UpArrow	Move highlight up a line.
DownArrow	Move highlight down a line.
Left/RightArrow	Move between file list and Sort Order group box.
Tab	Move between all selections.

continued

Table 8-1 Directory Sort navigation keys (continued)

PageUp	Scroll up a screen.
PageDown	Scroll down a screen.
Home	Move highlight to the beginning of the file list.
End	Move highlight to the end of the file list.
Spacebar	Tag a file for moving (arrowheads mark the file). The UpArrow and DownArrow keys now move the file, not just the highlight. After moving, press Spacebar again or press Enter to untag the file and leave it in its new position.
Esc	Cancel a move operation and return the file to its starting point.

You can change the default settings using the following options in the Directory Sort dialog box.

Sort Order: Select sort order and criteria keys with the check boxes. A number appears to its left showing sort priority. Your first selection becomes sort key number one and is the primary key, your second selection becomes the secondary key, and so on.

NOTE: The Key field below the Sort Order check boxes shows the first letter of your choices. For example, choosing the Name and Size sort order options makes the letters NS appear.

Table 8-2 describes the keyboard keys you use to select a key and specify sorting in ascending or descending order.

Table 8-2 Sort order navigation keys

Key	Function
Plus (+)	Change sort order of selected key to ascending.
Minus (-)	Change sort order of selected key to descending.
Spacebar	Select or deselect a key.

Sort Subdirs: Check to sort the subdirectories within the current directory. A dialog box displays the name of each directory as sorting progresses. If there are no subdirectories in the current directory, this option has no effect.

Change Dir...: Select to display the Change Directory dialog box. You can choose a different drive or directory from the list boxes or type a new path in the Path text box. If you do not have a mouse, press PageDown to see the list of drives.

Re-sort: Select to sort the file list using the specified sort keys. To interrupt the sort, press Esc. This sort is not permanent until you select Write to write it to disk.

Write: Select to write a sorted directory to disk. You cannot write a sorted network directory to a network disk.

Quit: Select to exit Directory Sort.

CHAPTER

9 Disk Editor (DISKEDIT)

This chapter describes using Disk Editor to:

- Examine and modify areas of your disk, including files, directories, clusters, sectors, and system areas
- Change the Disk Editor view to properly examine an area of your disk
- Save (or undo) modifications to your disk
- Search an area of your disk for a particular data string
- Edit disk parameters
- Access your disk's diagnostic cylinder

What It Does

Disk Editor (DISKEDIT) is an all-purpose sector editor capable of accessing virtually any area of a hard or floppy disk. You can work with files and directories, the partition table, the boot record, the file allocation tables (FATs), and the diagnostic cylinder on most hard disks. You can treat any group of clusters or sectors as an object to view and edit.

WARNING: It's vital that you understand what you're doing before you edit any area of a disk using Disk Editor. Otherwise, you could inadvertantly make the data on the disk inaccessible. For more information on disk elements and how they work, see Appendix A, "Disk Companion."

With Disk Editor, you can edit virtually any size disk provided you have enough expanded (EMS) or extended (XMS) memory.

If you have EMS memory, you must load the appropriate device driver so Disk Editor can access the memory.

If you have XMS memory, you do not need an EMS or XMS memory driver; Disk Editor can access XMS memory directly. However, for maximum compatibility with other software, you should install an EMS or XMS driver such as HIMEM, EMM386, QEMM386, or 386MAX.

When you edit a large disk, Disk Editor checks for sufficient available EMS or XMS memory. If you don't have enough memory, an error message appears.

When to Use It

Use Disk Editor when you need to lift data from a damaged disk. You can find the root directory of a damaged disk, and treat the damaged disk as a logical disk so you can work with its clusters, files, and directories. See Appendix B, "Troubleshooter," for the most common Disk Editor data recovery procedures.

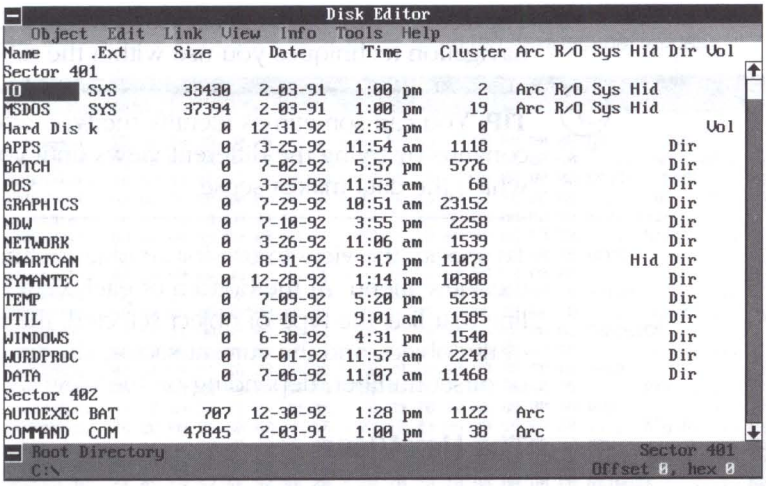
With Disk Editor you can access the unused portion of your disk, including the diagnostic cylinder. You can also overwrite an area on the disk with a specific value and copy a block of information to another location on the disk or to another disk.

You can use Disk Editor when unknown files appear on your disk and you can't read them using normal methods. Disk Editor also allows you to browse disks formatted with an operating system other than DOS.

How to Use It

To start Disk Editor, choose Disk Editor from the Norton Utilities main screen or type `DISKEDIT` at the DOS prompt. If you are starting it for the first time, the "Disk Editor is currently in Read-Only mode" message box appears. Select OK to finish loading Disk Editor. The Disk Editor screen shown in Figure 9-1 appears.

Figure 9-1 The Disk Editor screen


Disk Editor
Object Edit Link View Info Tools Help
Name .Ext Size Date Time Cluster Arc R/O Sys Hid Dir Vol
Sector 401
IO SYS 33430 2-03-91 1:00 pm 2 Arc R/O Sys Hid
MSDOS SYS 37394 2-03-91 1:00 pm 19 Arc R/O Sys Hid
Hard Dis k 0 12-31-92 2:35 pm 0 Vol
APPS 0 3-25-92 11:54 am 1118 Dir
BATCH 0 7-02-92 5:57 pm 5776 Dir
DOS 0 3-25-92 11:53 am 68 Dir
GRAPHICS 0 7-29-92 10:51 am 23152 Dir
NDW 0 7-10-92 3:55 pm 2258 Dir
NETWORK 0 3-26-92 11:06 am 1539 Dir
SMARTCAN 0 8-31-92 3:17 pm 11073 Hid Dir
SYMANTEC 0 12-28-92 1:14 pm 10308 Dir
TEMP 0 7-09-92 5:20 pm 5233 Dir
UTIL 0 5-18-92 9:01 am 1585 Dir
WINDOWS 0 6-30-92 4:31 pm 1540 Dir
WORDPROC 0 7-01-92 11:57 am 2247 Dir
DATA 0 7-06-92 11:07 am 11468 Dir
Sector 402
AUTOEXEC BAT 707 12-30-92 1:28 pm 1122 Arc
COMMAND COM 47845 2-03-91 1:00 pm 38 Arc
Root Directory
Sector 401
C:\
Offset 0, hex 0

When you start Disk Editor, the current directory is selected as the *object*, or the area of your disk to examine and edit. Each Disk Editor object has a corresponding screen display, or *view*. Because the object is a directory when you first open Disk Editor, Directory view is automatically selected. See "Selecting Objects" and "Editing Objects" later in this chapter for information on working with other kinds of disk objects. The Disk Editor views are described in the next section, "Working with Views."

To edit your disk, you must turn the read-only mode off. Choose CONFIGURATION... from the Tools menu. When the Configuration dialog box appears, uncheck the Read Only check box. Select Save to keep the configuration for this and all future Disk Editor sessions, or select OK to keep the configuration only until you quit Disk Editor. For more information on configuration options, see "The Tools Menu" later in this chapter.

You can also turn the read-only mode off, as well as specify a directory or file to view or edit, directly from the DOS prompt. See Appendix C, "Command Line Reference," for more information on Disk Editor command-line switches.

Working with Views

This section describes the six views in Disk Editor, including navigation techniques you use within the different views.

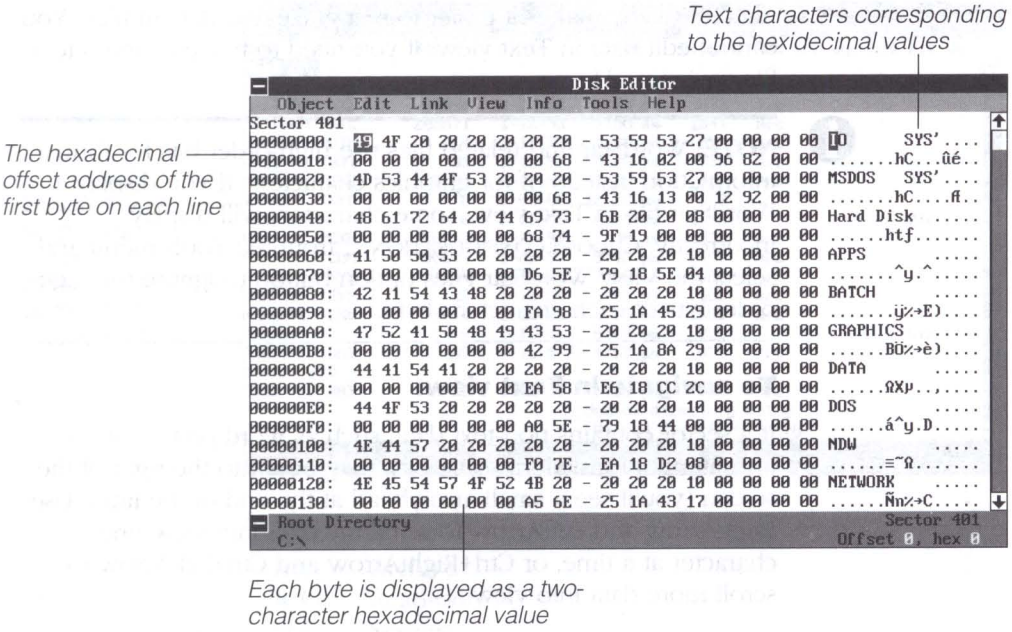
TIP: You can sometimes identify the type of data an object contains by trying the different views until you find one in which the data makes sense.

To specify the view to use for an object, choose the view from the View menu. At the bottom of each view, you'll see a status line that lists the type of object selected, the name and location of the object, and the current sector, cluster, hexadecimal, and/or offset number, depending on the view.

The Hex View

The Hex view is the main view for editing. In addition, it is the default view when no other view is appropriate, such as when a damaged disk's readable sectors are all that Disk Editor can access. Hex view is also the default view when the Auto View configuration option accessed from the Tools menu's CONFIGURATION... command is unchecked. The Hex view is divided into three sections, as shown in Figure 9-2.

Figure 9-2 Disk Editor in Hex view



To navigate in Hex view:

The hexadecimal data and text sections each contain a cursor; the active cursor blinks while the inactive one is solid. Press Tab to move the active cursor from one section to the other. Both sections of the screen reflect the changes you make.

Press Ctrl+PageUp and and Ctrl+PageDown to move one sector or cluster at a time. Press Home to move to the beginning of the object and End to move to the end.

With a mouse, click the shaded area above or below the scroll bar with the left mouse button to move up or down one screen at a time. Click the shaded area above or below the scroll bar with the right mouse button to move one sector at a time.

You cannot scroll beyond the beginning or end of the selected object.

The Text View

The Text view makes it easier to recognize text data in files. You cannot edit data in Text view; if you need to make changes to a file, switch to Hex view.

NOTE: WordStar and related files use high-order bits for format information instead of for graphics characters. If you display a WordStar file in Text view, some characters will display incorrectly. Choose CONFIGURATION... from the Tools menu and select the View WordStar Files option button to ignore the high-order bits of each character's byte.

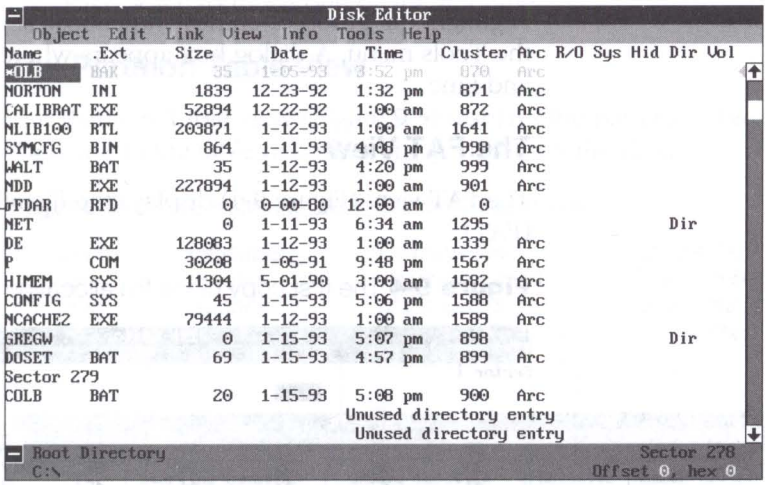
To navigate in Text view:

If a sector contains non-text data, such as word processor formatting information, some of it may be off to the right of the screen (you'll see a small arrowhead at the end of the line). Use RightArrow and LeftArrow to scroll the data into view one character at a time, or Ctrl+RightArrow and Ctrl+LeftArrow to scroll more data into view.

The Directory View

Use the Directory view to view and edit a directory object. Each line in the Directory view represents one directory entry, which can be a file or a directory. Figure 9-3 shows a standard directory in Directory view.

Figure 9-3 A root directory in Directory view


Disk Editor
Object Edit Link View Info Tools Help
Name .Ext Size Date Time Cluster Arc R/O Sys Hid Dir Vol
*OLB BAK 35 1-05-93 3:52 pm 870 Arc
NORTON INI 1839 12-23-92 1:32 pm 871 Arc
CALIBRAT EXE 52894 12-22-92 1:00 am 872 Arc
NLIB100 RTL 203871 1-12-93 1:00 am 1641 Arc
SYMCFG BIN 864 1-11-93 4:08 pm 998 Arc
WALT BAT 35 1-12-93 4:20 pm 999 Arc
NDD EXE 227894 1-12-93 1:00 am 901 Arc
σFDAR RFD 0 0-00-80 12:00 am 0
NET 0 1-11-93 6:34 am 1295 Dir
DE EXE 128083 1-12-93 1:00 am 1339 Arc
P COM 30208 1-05-91 9:48 pm 1567 Arc
HIMEM SYS 11304 5-01-90 3:00 am 1582 Arc
CONFIG SYS 45 1-15-93 5:06 pm 1588 Arc
NCACHE2 EXE 79444 1-12-93 1:00 am 1589 Arc
GREGW 0 1-15-93 5:07 pm 898 Dir
DOSET BAT 69 1-15-93 4:57 pm 899 Arc
Sector 279
COLB BAT 20 1-15-93 5:08 pm 900 Arc
Unused directory entry
Unused directory entry
Root Directory
C:\
Sector 278
Offset 0, hex 0

Erased entries have a sigma symbol (hexadecimal E5) as their first character

Attributes are displayed as follows in Directory view:

Arc	Archive
R/O	Read-only
Sys	System
Hid	Hidden
Dir	Directory (the entry is a directory, not a file)
Vol	Volume label

To navigate in Directory view:

When Disk Editor is in read-only mode, press LeftArrow and RightArrow to move from field to field. When read-only mode is off, press Tab and Shift+Tab to move between fields. Press LeftArrow and RightArrow to move within a field. Press Home to move to the first entry and End to move to the last. On the numeric keypad, press + (plus) and - (minus) to move one sector or cluster at a time.

To set attributes for a group of entries:

Highlight the group of entries and choose SET ATTRIBUTES... from the Tools menu. A dialog box appears where you set and clear attributes.

To set the date and time for a group of entries:

Highlight the group of entries and choose SET DATE/TIME... from the Tools menu. A dialog box appears where you enter the date and time.

The FAT View

The FAT view (Figure 9-4) displays the file allocation table (FAT).

Figure 9-4 The first copy of the file allocation table in FAT view

If the Quick Move configuration option is unchecked, the current cluster chain is highlighted

Disk Editor

Object Edit Link View Info Tools Help

Sector 1

		3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	<EOF>	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	<EOF>	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	<EOF>	63	64
65	66	67	68	69	<EOF>	<EOF>	<EOF>
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104
105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128
129	130	131	132	133	134	<EOF>	136
137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152
153	154	155	156	157	158	159	160

FAT (1st Copy) Sector 1
C:\IO.SYS Cluster 2, Hex 2

Each field in FAT view represents one cluster and contains one of the following values:

0	Unused cluster
2 through *n*	Number of next cluster in chain, where *n* represents the maximum cluster address (the maximum varies with disk size)
<EOF>	Last cluster in chain; "end of file" marker
<BAD>	Bad cluster; not used

To navigate in FAT view:

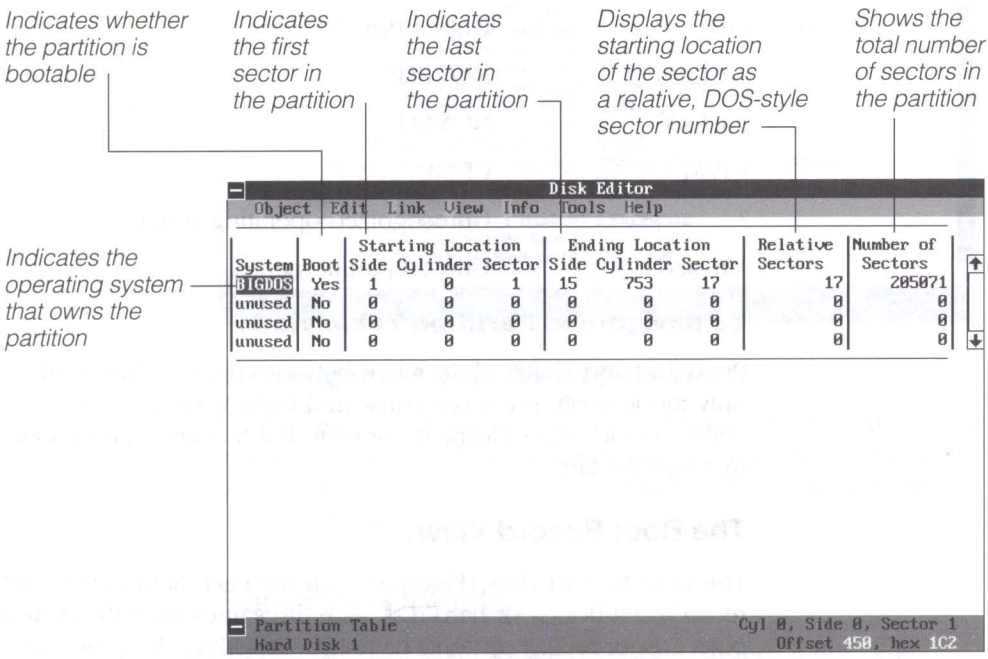
Press Tab and Shift+Tab to move between clusters. When read-only mode is off, you can press LeftArrow and RightArrow to move within a field. Press Home to move to the first cluster

entry and End to move to the last. Press Ctrl+PageUp and Ctrl+PageDown to move one sector at a time.

The Partition Table View

The Partition Table view (Figure 9-5) displays the partition table. Each line in the table describes one partition on the disk.

Figure 9-5 A partition table in Partition Table view


Indicates whether the partition is bootable
Indicates the first sector in the partition
Indicates the last sector in the partition
Displays the starting location of the sector as a relative, DOS-style sector number
Shows the total number of sectors in the partition
Indicates the operating system that owns the partition
Disk Editor
Object Edit Link View Info Tools Help
Starting Location
Ending Location
System Boot Side Cylinder Sector Side Cylinder Sector Relative Sectors Number of Sectors
BIGDOS Yes 1 0 1 15 753 17 17 205071
unused No 0 0 0 0 0 0 0 0
unused No 0 0 0 0 0 0 0 0
unused No 0 0 0 0 0 0 0 0
Partition Table
Hard Disk 1
Cyl 0, Side 0, Sector 1
Offset 450, hex 1C2

The System column can have the following values:

Value	Definition
DOS-12	DOS (12-bit FAT)
DOS-16	DOS (16-bit FAT)
EXTEND	DOS (extended partition)
BIGDOS	Compaq DOS 3.31, DOS 4.0, DOS 5.0 and higher, and any disk larger than 32MB
XENIX	XENIX
BBT	UNIX (Bad Block Table)

386-ix	UNIX
PCIX	PCIX
HPFS	High Performance File System (OS/2)
Split	SplitDrive
Speed	SpeedStor
DM	Disk Manager
GB	GoldenBow VFeature
NET286	NOVELL
NET386	NOVELL
CP/M	CP/M
?	Unrecognized operating system
Unused	Unused partition entry

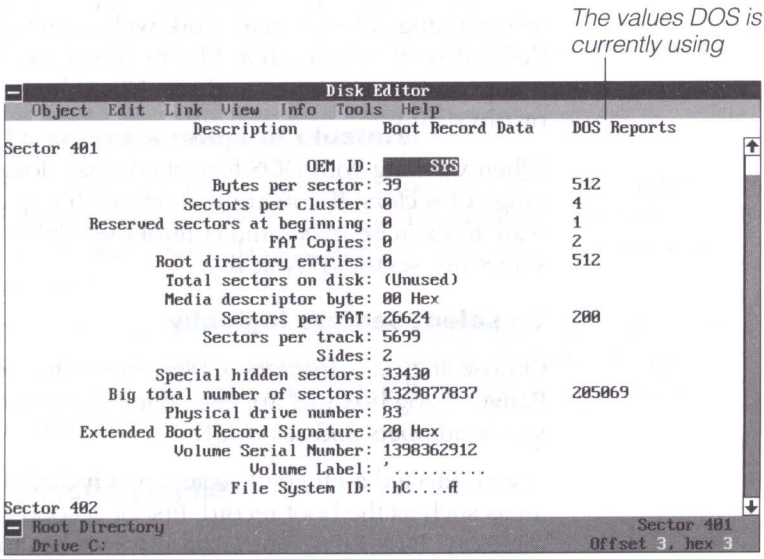
To navigate in Partition Table view:

Press Tab and Shift+Tab to move between fields. When read-only mode is off, press LeftArrow and RightArrow to move within a field. Press Home to move to the first entry and End to move to the last.

The Boot Record View

The Boot Record view (Figure 9-6) shows each field in the boot record on a floppy or hard disk with the values from the current object. Boot record contents have grown with each version of DOS, so in earlier DOS versions the last few fields are unused.

Figure 9-6 The Boot Record view


The values DOS is currently using
Disk Editor
Object Edit Link View Info Tools Help
Description Boot Record Data DOS Reports
Sector 401
OEM ID: SYS
Bytes per sector: 39 512
Sectors per cluster: 0 4
Reserved sectors at beginning: 0 1
FAT Copies: 0 2
Root directory entries: 0 512
Total sectors on disk: (Unused)
Media descriptor byte: 00 Hex
Sectors per FAT: 26624 200
Sectors per track: 5699
Sides: 2
Special hidden sectors: 33430
Big total number of sectors: 1329877837 205069
Physical drive number: 83
Extended Boot Record Signature: 28 Hex
Volume Serial Number: 1398362912
Volume Label: '.....
File System ID: .hC....fA
Sector 402
Root Directory Sector 401
Drive C: Offset 3, hex 3

To navigate in Boot Record view:

Press PageUp and PageDown to move between fields. When read-only mode is off, press LeftArrow and RightArrow to move within a field. Press Home to move to the first entry and End to move to the last.

Selecting Objects

With Disk Editor you can select sectors, clusters, a file, or a directory as your object to view and edit. When selecting sectors and clusters, you need to provide the range numbers for Disk Editor to select as a single object. You select files and directories by name.

You can also select one of the four system areas—the partition table, the boot record, the first copy of the FAT, and the second copy of the FAT—as an object. Other objects you can select with Disk Editor include the clipboard and a range of conventional memory.

Selecting Sectors

Select a range of sectors to work with a data object that is not defined by a system area, file, or directory. A sector is composed of 512 bytes and can be addressed logically or physically.

When working with DOS-formatted disks, logically select a range of sectors. If you are working with a non-DOS disk, or want to exercise maximum control over the selection process, select the sectors physically.

To select sectors logically:

Choose SECTOR... from the Object menu. In the Select Sector Range dialog box that appears, enter the starting and ending sector numbers and select OK.

If you selected a range of sectors that includes one of the system areas such as the boot record, first or second FAT, or the root directory, Disk Editor automatically switches to the corresponding view.

To select sectors physically:

Choose PHYSICAL SECTOR... from the Object menu. In the Select Physical Sector Range dialog box that appears, enter the cylinder, side, and sector numbers using the basic input/output system (BIOS) sector addressing scheme. Then, enter the number of sectors to select from the current sector in the Number of Sectors text box and select OK. Disk Editor displays the selected sectors in Hex view.

For example, if you want to select 1000 sectors from the first sector on your disk, cylinder 0, side 0, and sector 1, enter 1000 into the Number of Sectors text box.

For detailed information on sector addressing, see Appendix A, "Disk Companion."

Selecting Clusters

Select a range of clusters to recover partially overwritten or destroyed files, or to work with a data object with allocation units larger than sectors.

Clusters are the data units DOS uses to allocate disk space to files and directories. If you know the range of clusters an

overwritten or lost file occupied, you can select that range and recover the remaining clusters for the file.

For more information on recovering clusters, see Appendix B, "Troubleshooter."

To select a range of clusters:

Switch to Logical disk mode by choosing DRIVE... from the Object menu. The Select the Disk You Wish to Edit dialog box appears. Select Logical disks in the Type group box then select OK.

Next, choose CLUSTER... from the Object menu. Enter the starting and ending cluster numbers in the Select Cluster Range dialog box and select OK. Disk Editor displays the clusters in Hex view.

Selecting a File

You can select files to view and edit in one of two ways. You can highlight the file in Directory view and press Enter, or choose FILE... from the Object menu and enter the filename in the Select File dialog box. The file is displayed in Hex view when you use the first method, and in Text view when you use the second.

Selecting a Directory

You can select directories to edit in one of two ways. You can highlight the directory entry in Directory view and press Enter, or choose DIRECTORY... from the Object menu and select the directory from the directory tree in the Change Directory dialog box. Disk Editor displays the selected directory in Directory view.

Selecting a System Area

You can select four system areas to view and edit: the partition table, boot record, first FAT, and second FAT. Choose the system area you want to edit from the Object menu. Disk Editor displays the system area in the corresponding view.

WARNING: Be careful when editing system areas. Entering incorrect values can render the disk inaccessible or cause data loss.

Selecting a Range of Conventional Memory

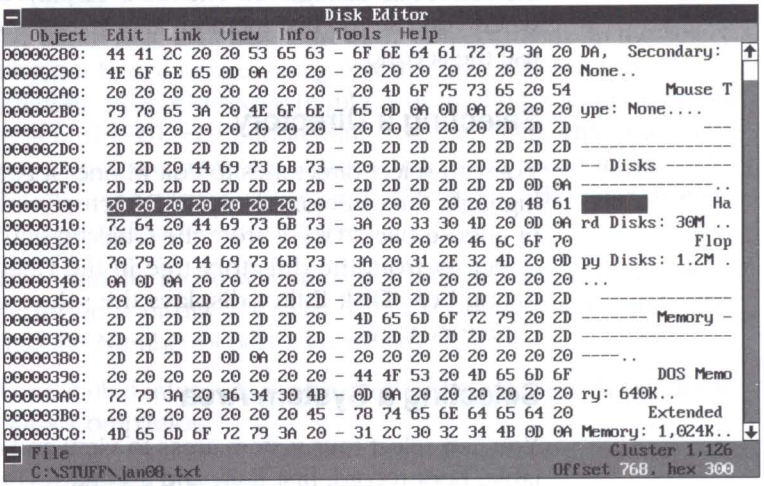
You can view and copy from a range of conventional memory by choosing MEMORY DUMP... from the Object menu. Enter the starting and ending addresses, in hexadecimal format, in the Memory Dump dialog box and select OK. Disk Editor displays the memory range in Hex view.

Editing Objects

You can edit selected objects in five of the Disk Editor views: Hex, Directory, FAT, Partition Table, and Boot Record. You cannot edit in Text view; to edit text, switch to Hex view and edit the text column.

To edit in Disk Editor, you type over the existing data. You can never insert data. Changes are highlighted on the screen until you save, undo, or discard them as shown in Figure 9-7. Furthermore, you cannot make any changes if Disk Editor is in read-only mode.

Figure 9-7 Changes highlighted in Disk Editor



All views except Hex view restrict illegal entries. For example, you cannot enter any values other than valid cluster numbers in FAT view. In Hex view, however, Disk Editor does not check the validity of your changes.

WARNING: Be careful when editing directories or system areas. If you make a mistake, DOS may not be able to access the files correctly or data may be lost. Use caution when editing the FAT so that you do not create cross-linked clusters, where the cluster chains of two different files include a common cluster.

The following list describes editing techniques for specific views:

- Hex view: To enter ASCII characters in the text section, hold down the Alt key while you type the decimal code for the character on the numeric keypad. The Tools menu contains an ASCII table to help you find the correct decimal codes.
- Directory view: To toggle file attributes, move the cursor to the appropriate field and press the Spacebar.
- FAT view: Press E to enter an <EOF> value and B to enter a <BAD> value.
- Partition Table view: For the System and Boot fields, press the Spacebar to toggle the Yes and No values.

In addition to the standard editing features, Disk Editor offers the following advanced editing features in all views (except Text view): the clipboard, the fill feature, and split windows.

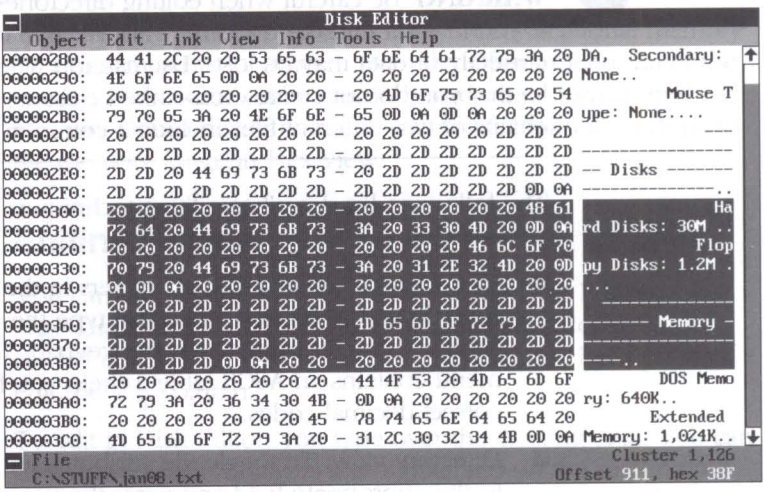
Using the Clipboard

The clipboard is a 4096-byte memory buffer that you use to copy blocks of data from one place to another. To use it, mark a block of data, copy it to the clipboard, move the cursor to the target location, and paste the block from the clipboard.

To mark a block:

Position the cursor at one end of the block, choose MARK from the Edit menu, and move the cursor to the other end of the block using the arrow keys. With a mouse, drag the mouse pointer over the block. The highlight grows as you move the cursor or mouse pointer as shown in Figure 9-8. In Hex view, it is highlighted in both the hex and text sections.

Figure 9-8 Marking blocks in Disk Editor



To unmark the block:

Select MARK again, then press an arrow key or click anywhere with the mouse.

To copy the block to the clipboard:

Choose COPY from the Edit menu. The block is copied to the clipboard, replacing its former contents, even if the clipboard was full and the new block is only one byte.

Data stays in the clipboard until you overwrite it or exit Disk Editor. You don't have to paste the block immediately, and you can paste it into several locations.

To paste from the clipboard:

Position the cursor and select PASTE OVER from the Edit menu. The contents of the clipboard are written into the object starting at the cursor position, overwriting the former values.

Each time you paste, the bytes that were changed are highlighted. To undo the paste and restore the former values, choose UNDO from the Edit menu. You cannot undo a paste across a sector boundary.

To select the clipboard as an object:

You can select the clipboard as an object when it contains data. Select CLIPBOARD from the Object menu, then view and edit it like any other object. When you paste, the edited version is pasted.

Filling Bytes with a Specified Character

When you fill a block of the current object with a specified character, the same character is placed in every byte in the block.

To fill a block:

Mark the area to be filled and choose FILL... from the Edit menu. The Fill dialog box prompts you for the fill character, giving you a list of characters to choose from. Select the fill character. Every byte in the block is overwritten with the specified character.

You can fill any size block. However, you cannot undo a fill across sector boundaries.

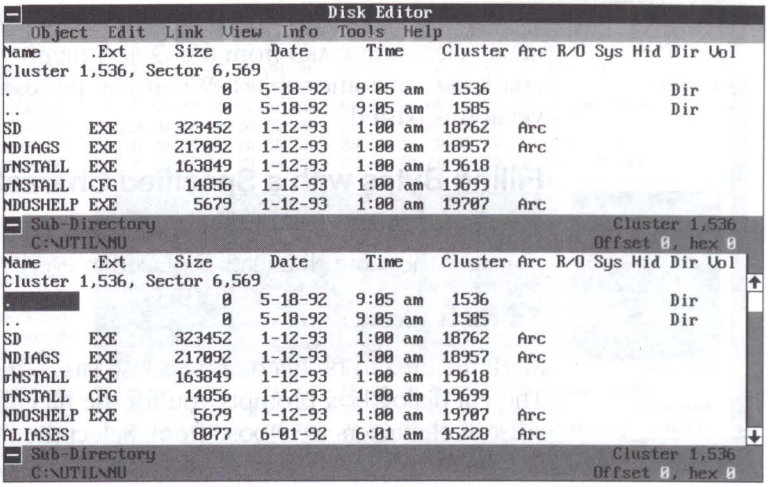
Working with Split Windows

You can view and edit two objects at once by opening a second window. You can also establish a dynamic link between the two windows so that changes in one are automatically reflected in the other. Disk Editor also compares the two windows, highlighting any bytes that are different.

To open the second window:

Choose SPLIT WINDOW from the View menu, or drag the status bar up with the mouse. The second window appears in the bottom half of the screen as shown in Figure 9-9, containing the same object and view as the first window. The top window's status bar separates the two windows.

Figure 9-9 Disk Editor with split windows


Disk Editor
Object Edit Link View Info Tools Help
Name .Ext Size Date Time Cluster Arc R/O Sys Hid Dir Vol
Cluster 1,536, Sector 6,569
. 0 5-18-92 9:05 am 1536 Dir
.. 0 5-18-92 9:05 am 1585 Dir
SD EXE 323452 1-12-93 1:00 am 18762 Arc
MDIAGS EXE 217092 1-12-93 1:00 am 18957 Arc
INSTALL EXE 163849 1-12-93 1:00 am 19618
INSTALL CFG 14856 1-12-93 1:00 am 19699
MDOSHELP EXE 5679 1-12-93 1:00 am 19707 Arc
Sub-Directory Cluster 1,536
C:\UTIL\NU Offset 0, hex 0
Name .Ext Size Date Time Cluster Arc R/O Sys Hid Dir Vol
Cluster 1,536, Sector 6,569
. 0 5-18-92 9:05 am 1536 Dir
.. 0 5-18-92 9:05 am 1585 Dir
SD EXE 323452 1-12-93 1:00 am 18762 Arc
MDIAGS EXE 217092 1-12-93 1:00 am 18957 Arc
INSTALL EXE 163849 1-12-93 1:00 am 19618
INSTALL CFG 14856 1-12-93 1:00 am 19699
MDOSHELP EXE 5679 1-12-93 1:00 am 19707 Arc
ALIASES 8077 6-01-92 6:01 am 45228 Arc
Sub-Directory Cluster 1,536
C:\UTIL\NU Offset 0, hex 0

You can change the contents of one window without affecting the other window. Only one window is active at a time. The active window contains the cursor and is the focus of all keyboard and menu actions. To activate the other window, select SWITCH WINDOWS from the View menu or click inside the second window.

To adjust the sizes of the windows:

Choose GROW WINDOW or SHRINK WINDOW from the View menu to adjust the size of the active window by one line. With a mouse, drag the top status bar to resize the windows. The smallest window size is one line plus the status bar. Some views have larger minimum sizes because they need to display labels with at least one line of data.

To close the active window:

Select UNSPLIT WINDOW... from the View menu or click the appropriate close box (the box in the upper-left corner of the status line) with the mouse.

To link the two windows:

Certain types of objects can establish dynamic links between windows. For example, if you have a FAT in the top window and select WINDOW from the Link menu, the bottom window

shows the contents of the cluster highlighted in the top window. As you move the highlight in the top window, the contents of the bottom window change accordingly.

To break the dynamic link, select WINDOW from the Link menu again.

To compare the contents of two windows:

Position the cursor where you want the comparison to start. Then, select COMPARE WINDOWS... from the Tools menu. The Compare dialog box appears. If a difference is found, the comparison stops with the cursor on the unmatched byte in the active window. To continue the comparison from the current position, choose COMPARE WINDOWS... again.

Undoing Changes

With the UNDO command, you can reverse changes of up to 512 bytes as long as you don't cross a sector boundary. Changes are undone in the reverse order in which you made them. You cannot undo changes written to a disk.

You can also undo all changes made in the current sector using the DISCARD CHANGES... command in the Edit menu. When you select DISCARD CHANGES... the Discard Changes dialog box appears. Choose the Discard button to discard the changes or the Review button to review them.

In Hex view, you can also undo any changes by pressing Backspace over the changed element. With Backspace, you can undo changes one-half byte at a time, whereas the UNDO command undoes changes to a complete byte.

Saving Changes

You can save changes anytime by selecting WRITE CHANGES... from the Edit menu. In the Write Changes dialog box, select Write to save the changes or Review to review them.

Whenever you cross a sector boundary while editing, you must write or discard your changes.

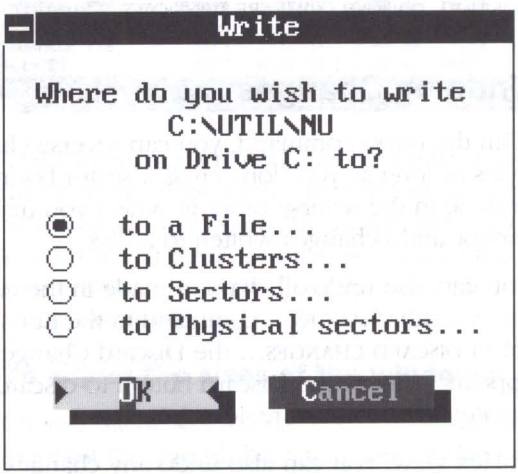
Writing an Object Out

You can write the current object to a new object or to another area on a disk. For example, you can write a range of clusters as a new file, copy a range of physical sectors to a range of logical sectors, or write a copy of a system area so that you can edit the copy instead of the original.

To write an object out:

Select the object and choose WRITE OBJECT TO... from the Tools menu. The Write dialog box appears as shown in Figure 9-10.

Figure 9-10 The Write dialog box



Select To a File... to write the object to a file, or To Clusters..., To Sectors..., or To Physical Sectors...to write to a range of clusters, sectors, or physical sectors, respectively. Enter the filename for a file, or the location and range of clusters, sectors, or physical sectors for the object to be written to and select OK. Select Yes in the confirmation dialog box to complete the write operation.

Linking to Related Objects

Files, their directory entries, and their FAT entries are closely related. When viewing or editing one of these objects, you might need to examine the other two. Similarly, when you are fixing the partition table, you might need to access the boot record

and other partition tables. With Disk Editor, you can link to or select a related object.

To link to a related object:

Select the object you want to link to from the Link menu. For example, if you are examining the data in a file, Disk Editor knows that the cursor is currently in an area belonging to a file whether the current object is the file, the sector, or the cluster. On the Link menu, two options are available: DIRECTORY and CLUSTER CHAIN (FAT). Selecting DIRECTORY switches objects to the directory containing the file and switches to the Directory view with the file highlighted. Selecting CLUSTER CHAIN (FAT) switches to the appropriate portion of the FAT, with the cursor on the cluster you are examining and the cluster chain highlighted (if the Quick Move option accessed from the Tools menu's CONFIGURATION... command is unchecked). You can examine any area of the directory or the FAT.

If the Auto View option accessed from the Tools menu's CONFIGURATION... command is checked, the appropriate viewer appears when you link to a related object. Otherwise, the linked object appears in the viewer you were using before the link.

Finally, when the Quick Links configuration option accessed from the Tools menu is checked, you can press Enter or double-click the mouse on an entry to make the link rather than using the Link menu. Press Enter or double-click the mouse again to return to the original object. See "The Tools Menu" later in this chapter for more information on these configuration options.

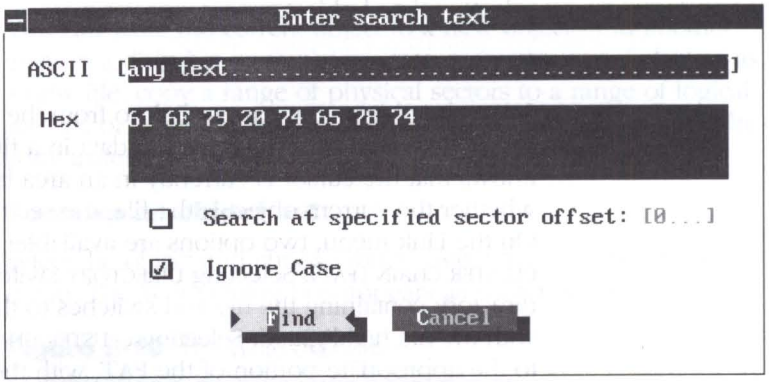
Searching for Specific Data

You can search an object for text in ASCII or hexadecimal format, distinguish between upper- and lowercase characters, and specify sector offset searches.

To search for text:

Choose FIND... from the Tools menu. The Enter Search Text dialog box appears. Enter the search string in either the ASCII or Hex text box. The corresponding ASCII or hex string appears in the other text box (Figure 9-11).

Figure 9-11 The Enter Search Text dialog box



By default, the search starts at the cursor position. Check the Search At Specified Sector Offset check box and enter an offset number in the text box to search for the string only at the specified offset within each sector.

The Ignore Case check box is checked by default for a case-insensitive search. Keep in mind that with Ignore Case checked, hex 41 (ASCII A) matches hex 61 (ASCII a).

Choose the Find button to start the search. When found, the search string is highlighted and displayed in Hex view. If the object is large and the search string isn't found immediately, a dialog box displays the progress of the search.

Disk Editor remembers the search string until you enter another string or exit Disk Editor. To continue the search from the current cursor position, choose FIND AGAIN from the Tools menu.

Using Advanced Recovery Mode

If your disk is damaged and you can only access it physically and not logically, Disk Editor can "virtualize" the disk to treat it as a logical disk so you can recover data from it.

When your hard disk is working correctly, you access it logically using sectors, clusters, FATs, directories, and so forth. However, if your hard disk becomes damaged, you may only be able to access it physically. When you access a disk physically, you must work with sectors using the basic input output system (BIOS) sector addressing scheme, which designates sectors by

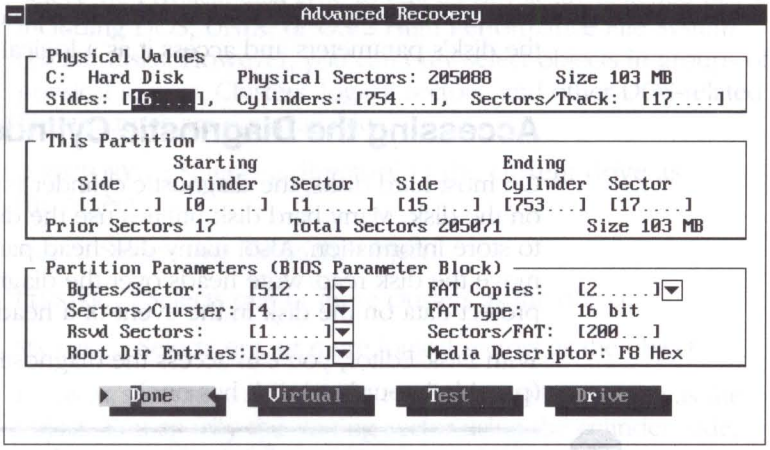
cylinder, side, and sector number. This process is very difficult to use during data recovery procedures.

To make recovery easier, Disk Editor can calculate all the disk's logical parameters or lets you manually enter the parameters if you know the correct values. With the parameters correctly applied, Disk Editor can access the disk as if it were not damaged.

To edit a disk's parameters:

Choose ADVANCED RECOVERY MODE... from the Tools menu. A warning dialog box appears, followed by the Advanced Recovery dialog box which contains the values calculated by Disk Editor as shown in Figure 9-12.

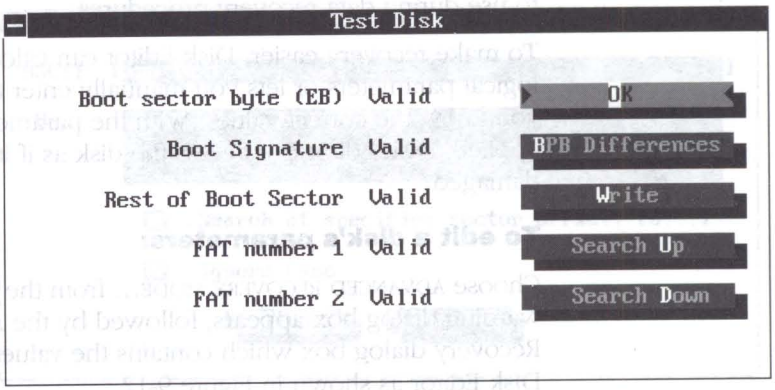
Figure 9-12 The Advanced Recovery dialog box



To specify a disk to edit, select the Drive command button. Then, select the disk and select OK.

Before you virtualize a disk, select the Test button to test the calculated disk parameters. Disk Editor tests the values and displays the Test Disk dialog box with the results as shown in Figure 9-13. Any incorrectly calculated system areas are marked as Invalid.

Figure 9-13 The Test Disk dialog box



After verifying that the disk parameters are valid, select OK to return to the Advanced Recovery dialog box. Then, select the Virtual button on the Advanced Recovery dialog box to change the disk's parameters and access it as a logical disk.

Accessing the Diagnostic Cylinder

On most hard disks, the diagnostic cylinder is the last cylinder on the disk. Many hard disk utilities use the diagnostic cylinder to store information. Also, many disk head parking programs move the disk read/write heads over the diagnostic cylinder to protect data on the disk in the event of a head crash.

With Disk Editor, you can access the diagnostic cylinder (provided your hard disk has one).

WARNING: Some hard disks store critical system information on the diagnostic cylinder. If this data is tampered with in any way, it may render your disk inaccessible.

To access the diagnostic cylinder:

Start Disk Editor with the /M switch for Maintenance mode; this bypasses DOS and accesses the diagnostic cylinder directly. Disk Editor displays cylinder 0, side 0, sector 1 in Hex view. Choose PHYSICAL SECTOR... from the Object menu. The Select Physical Sector Range dialog box appears. Enter the last cylinder number into the Cylinder text box and select OK. The last cylinder value appears in the Legal Values column.

Disk Editor Menu Commands

This section describes all the Disk Editor pull-down menu commands.

The Object Menu

DRIVE... : Selects the logical or physical disk that contains the object you want to edit.

Select the Logical disk type to edit the disks that DOS recognizes, including device-driven drives such as RAM drives. On Novell, Lantastic, and Banyan network drives you can edit files, but you can't select any other disk or data entity as an object.

Select the Physical disk type to edit all physically attached disks, including DOS, UNIX, or OS/2 High Performance File System (HPFS) disks. However, you can only select objects in groups of physical sectors. Clusters, logical sectors, and other DOS-related file structures are not available.

DIRECTORY...: Selects a directory in the current drive as the object.

FILE...: Selects one file as the object.

CLUSTER...: Selects one or more clusters as the object.

SECTOR...: Selects one or more logical sectors as the object.

PHYSICAL SECTOR...: Selects one or more physical sectors as the object. You specify the starting sector using the cylinder, side, and sector address scheme. You must also specify the number of sectors from the starting sector that you want to define as your object.

PARTITION TABLE: Selects the partition table of the current disk as the object.

BOOT RECORD: Selects the boot record of the current disk as the object.

1ST FAT: Selects the first copy of the file allocation table as the object.

2ND FAT: Selects the second copy of the file allocation table as the object.

CLIPBOARD: Selects the clipboard as the object. The status line indicates the size of the object in the clipboard in bytes. The clipboard can hold up to 4096 bytes of data. The contents of the clipboard remain intact until you write over them with COPY.

MEMORY DUMP...: Selects a range of conventional memory up to 1 MB (FFFF hex) as the object to view and copy, but not to edit. You specify the starting and ending addresses, in hexadecimal, of the memory range you want to select as the object.

EXIT: Quit Disk Editor.

The Edit Menu

UNDO: Undoes the most recent change in one byte increments. Up to 512 changes per sector can be remembered and undone in reverse order. You cannot undo changes written to disk.

MARK: Activates the selection marker from the current cursor position. After choosing MARK, move the cursor to the end of the block you want to mark. Choose MARK again to cancel the currently highlighted block. (This is the only available Edit menu command when Disk Editor is in read-only mode.)

COPY: Copies the marked block to the clipboard, overwriting the former contents.

PASTE OVER: Pastes the contents of the clipboard to the current cursor position, overwriting the old data. The changed bytes are highlighted. If you paste across a sector boundary, you cannot undo the changes.

FILL...: Fills a block of any size with a specified character. If you fill across a sector boundary, you cannot undo the changes.

WRITE CHANGES...: Writes all highlighted changes from memory to disk. After you write the changes, the change highlights disappear and you cannot undo the changes.

DISCARD CHANGES...: Undoes all highlighted changes to a sector.

The Link Menu

FILE: Selects the file related to the current FAT or directory entry and displays it in Hex or Text view.

DIRECTORY: Selects the directory related to the current FAT entry or file and displays it in Directory view with the appropriate directory entry highlighted.

CLUSTER CHAIN (FAT): Selects the cluster chain in the first copy of the FAT related to the current directory entry or file.

PARTITION: Selects the highlighted partition table or the related boot record, whichever is more appropriate. Available only when you are editing the partition table.

WINDOW: Establishes a dynamic link between two windows so that moving the cursor in a window containing a FAT or directory causes the related file to appear in the other window. Available only when two windows are in use and the active window contains a directory or FAT object.

The View Menu

AS HEX: Displays the current object in Hex view.

AS TEXT: Displays the current object in Text view. Objects cannot be edited in Text view.

AS DIRECTORY: Displays the current object in Directory view.

AS FAT: Displays the current object in FAT view.

AS PARTITION TABLE: Displays the current object in Partition Table view.

AS BOOT RECORD: Displays the current object in Boot Record view.

SPLIT/UNSPLIT WINDOW: Creates two windows or eliminates the inactive window.

GROW WINDOW: Adds one line to the active window. Available only when the windows are split; does not function if the inactive window has reached its minimum size.

SHRINK WINDOW: Removes one line from the active window. Available only when the windows are split; does not function if the active window has reached its minimum size.

SWITCH WINDOWS: Makes the inactive window active.

The Info Menu

OBJECT INFO...: Displays information about the selected object. This command is unavailable when the object is a range of conventional memory.

For all the objects listed below, the Disk group box of the Info dialog box displays the drive letter, size in megabytes, and the type of disk containing the object. Possible disk types include floppy, hard, network, and device-driven drives such as RAM drives.

Files and Directories: Shows the name of the directory containing the file or directory, the file or directory's name, set attributes, data and time last modified, the starting cluster and sector number, the size in bytes, the size in number of clusters, and the number of file fragments.

Cluster: Shows the cluster number, file or directory name if appropriate, and the physical sector number of the first sector in the cluster.

Sector: Shows the logical sector number, the file or directory name if appropriate, and the physical sector number.

Physical Sector: Shows the number of sectors selected.

Partition Table: Shows the hard disk number and the partition signature in hexadecimal.

Boot Record: Shows the logical sector number, OEM signature, and sector signature in hexadecimal.

First Copy of FAT: Shows the file or directory name the current cluster belongs to; the total number of clusters, bad clusters, unused clusters, cluster chains, and FAT copies on the disk; and the number of sectors that each FAT occupies.

Second Copy of FAT: Shows the file or directory name the current cluster belongs to; the total number of clusters, bad clusters, unused clusters, cluster chains, and FAT copies on the disk; and the number of sectors that each FAT occupies.

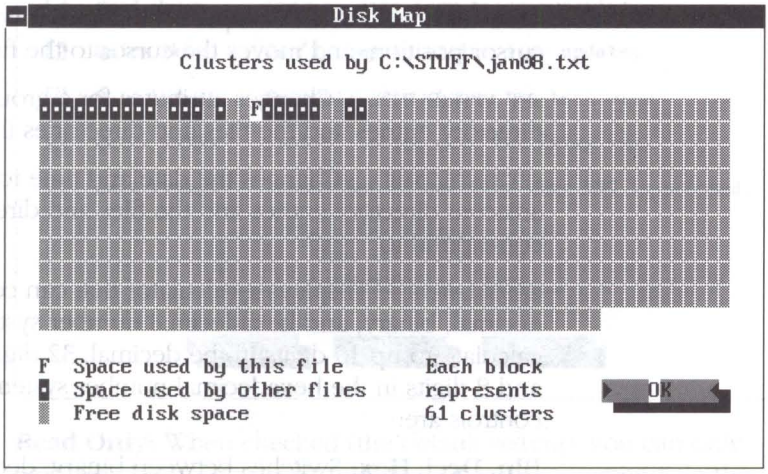
Clipboard: Displays the number of bytes in clipboard and the source object.

DRIVE INFO...: Displays detailed information about the current drive. When the Logical disks option is selected, information

about the disk's logical characteristics are also displayed. Otherwise, only the disk's physical characteristics are displayed.

MAP OF OBJECT...: Displays the clusters the object occupies as a graphical map, as shown in Figure 9-14.

Figure 9-14 The Disk Map



The blocks on the map represent some number of clusters determined by the disk size. An "F" represents each block used by the current object.

The Tools Menu

FIND...: Searches for a specified ASCII or hexadecimal string in the selected object.

FIND OBJECT: Performs special searches to find partition tables, boot records, FATs, and directories for data recovery on damaged disks.

FIND AGAIN: Continues the search for the current search string starting from the current cursor position.

WRITE OBJECT TO...: Copies the current object to the destination you specify, which can be a file, clusters, sectors, or physical sectors.

PRINT OBJECT AS...: Prints the object in Hex, Directory, FAT, Boot Sector, or Partition Table format.

RECALCULATE PARTITION: When editing a partition table in Partition Table view, calculates the Relative Sector based on the Starting Location sector value, and the Number of Sectors based on the Ending Location sector values.

COMPARE WINDOWS...: Compares data in two windows from the cursor position, and moves the cursor to the first difference.

SET ATTRIBUTES...: Changes attributes for a group of adjacent directory entries and the files and directories they correspond to.

SET DATE/TIME...: Changes the date and time for a group of adjacent directory entries and the files and directories they correspond to.

CALCULATOR...: Displays a calculator that can compute in decimal, binary, and hexadecimal number systems. It can calculate to up 10 digits in the decimal, 32 digits in the binary, and 8 digits in the hexadecimal number systems. The calculator controls are:

Bin, Deci, Hex: Switches between binary, decimal, and hexadecimal number systems. When in binary mode, only the 1 and 0 number keys work. In the decimal number mode, all number keys work. In hexadecimal mode, the number keys and the A, B, C, D, E, and F keys work.

2Comp: Calculates the 2s complement of the current value displayed in the window.

Swap: Swaps the first and second pairs of bytes in the stack.

Clear: Clears the calculator's memory.

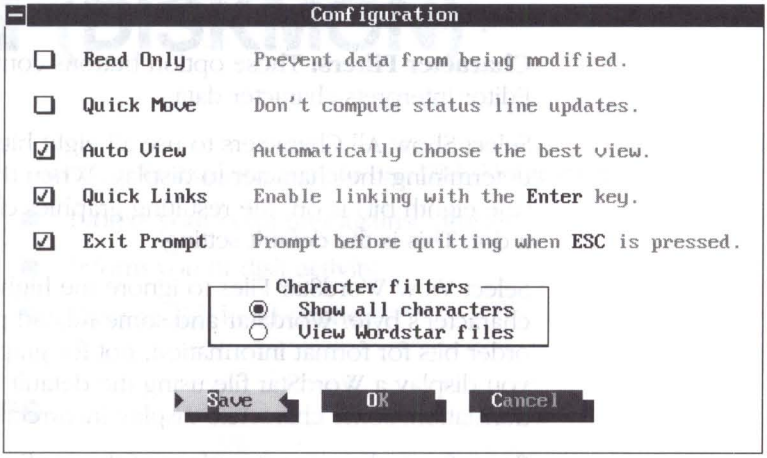
ADVANCED RECOVERY MODE...: Edits the disk's physical and logical parameters, such as number of sides, cylinders, and sectors.

USE 2ND FAT TABLE: Specifies that Disk Editor should view the disk using the second FAT table to recover data when the first FAT table is damaged beyond repair.

ASCII TABLE...: Displays a table of ASCII characters and their hexadecimal and decimal equivalents.

CONFIGURATION...: Configures Disk Editor options. When you choose this command, the Configuration dialog box shown in Figure 9-15 appears.

Figure 9-15 The Configuration dialog box



Read Only: When checked (the default setting), you can only view an object—you can't modify it. Also, all commands in the Edit menu except MARK are unavailable.

Quick Move: When unchecked (the default setting), Disk Editor computes and reports status line information such as filename, cluster number, and so forth as you navigate around the object. This display may slow Disk Editor down on some computers. Unchecking Quick Move is especially effective in FAT view, where it suppresses the filename on the status line and the highlighting of the current cluster chain.

Auto View: When checked (the default setting), Disk Editor selects the most appropriate viewer for your object. Hex view is selected when no other viewer seems appropriate. When unchecked, Hex view is always selected, although you can always switch to any other view.

Quick Links: When checked (the default setting), pressing Enter or double-clicking the mouse links to a related object. Files and directories automatically link to each other, the FAT links automatically to the selected file, and the partition table links automatically to the selected partition table or boot record.

When unchecked, you link to related objects using the Link menu commands. When you link, you are prompted to Save, Discard, or Review the changes before the link is performed.

Exit Prompt: When checked (the default setting), Disk Editor prompts you for a confirmation when you press Esc to exit the program.

Character Filters: These option buttons control how Disk Editor interprets character data.

Select Show All Characters to use all eight bits of a byte when determining the character to display. When the high-order bit (the eighth bit) is on, the resulting graphics character appears as a dot. This is the default setting.

Select View WordStar Files to ignore the high-order bits of each character's byte. WordStar and some related products use high-order bits for format information, not for graphics characters. If you display a WordStar file using the default character translation, some characters display incorrectly.

Save: Saves the current settings of the configuration options. The next time you start Disk Editor, the saved settings are in effect.

OK: Puts the current settings into effect without saving them. The settings last only until you quit Disk Editor.

Cancel: Closes the dialog box without making any changes.

CHAPTER

10 Disk Monitor (DISKMON)

This chapter explains how to use Disk Monitor to:

- Protect your computer against viruses
- Inform you of disk activity
- Prevent disk head crashes

What It Does

Disk Monitor (DISKMON), a terminate-and-stay-resident (TSR) program that uses about 8K of memory, provides three features to protect your disks from accidental and malicious damage:

Disk Protect prevents programs from writing to your disks' system areas, files, or entire volume without your approval. It protects from destructive writes by viruses, software malfunctions, and accidental erasures. It can prevent changes to your normal files on either local or network drives, but it cannot protect the system area of a network server (servers have their own disk-protection scheme).

Disk Light displays the name of an accessed drive in the upper-right corner of your screen (except in graphics mode). Disk Light can help prevent you from turning off the power or removing a floppy disk while the system is still writing to the disk. It is particularly helpful with network drives, as it lets you see which network drives are being accessed.

Disk Park parks your hard disk heads, which can prevent damage to your disks when the power is off or if your computer gets moved. Disk Park only works on local hard disks.

NOTE: The following Norton Utilities automatically disable Disk Protect before they run: Calibrate, Directory Sort, Disk Editor, Disk Tools, FileFix, Image, Norton Diagnostics, Norton Disk Doctor, Rescue, SmartCan, Speed Disk, UnErase, UnFormat, and Wipe Information.

When to Use It

Use Disk Protect to prevent damage from virus infection or unstable software. Use Disk Light when you can't see all the drive lights on your computer. Use Disk Park just before you shut off your computer if your hard disk doesn't park its heads automatically.

TIP: To use Disk Monitor to guard your hard disk from the moment you start your computer, choose STARTUP PROGRAMS... from the Norton Utilities main screen's Configuration menu and select Start Disk Monitor to place the command in your AUTOEXEC.BAT file.

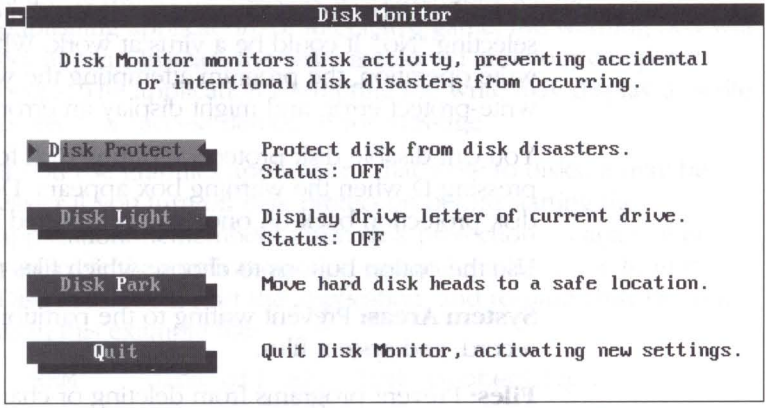
How to Use It

Choose Disk Monitor from the Norton Utilities main screen or type `DISKMON` at the DOS prompt. You can also specify Disk Monitor settings or check its status from the command line. See Appendix C, "Command Line Reference," for more information on using Disk Monitor from the command line.

NOTE: The first time you run Disk Monitor, it creates the file DISKMON.INI in the same directory as DISKMON.EXE. DISKMON.INI contains your disk protection parameters.

If you don't specify any settings with the DISKMON command, the Disk Monitor menu shown in Figure 10-1 appears.

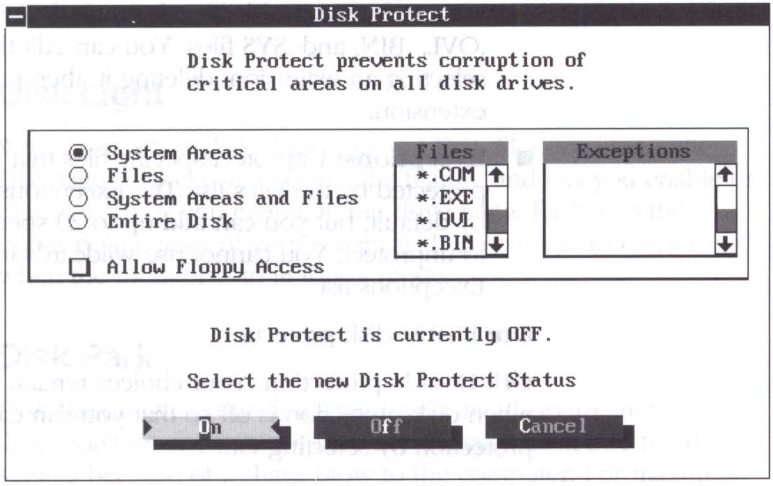
Figure 10-1 The Disk Monitor menu


Disk Monitor
Disk Monitor monitors disk activity, preventing accidental or intentional disk disasters from occurring.
Disk Protect
Protect disk from disk disasters.
Status: OFF
Disk Light
Display drive letter of current drive.
Status: OFF
Disk Park
Move hard disk heads to a safe location.
Quit
Quit Disk Monitor, activating new settings.

Disk Protect

Select Disk Protect from the Disk Monitor menu to turn disk protection on and off as well as control the protection level. Your selections apply to all drives. Set your disk protection parameters from the Disk Protect dialog box shown in Figure 10-2.

Figure 10-2 Disk Protect dialog box



With Disk Protect on, any write or name change attempted on a protected file is a disk write violation and Disk Monitor produces a warning box asking you to approve the attempted write. You may have to approve it several times. If you aren't sure what is being written, you can reject the operation by selecting "No." It could be a virus at work. When you reject a write operation, the program attempting the write receives a write-protect error, and might display an error message.

You can disable disk protection during disk formatting by pressing D when the warning box appears. Don't forget to turn disk protection back on once you've finished formatting.

Use the option buttons to choose which files to protect.

System Areas: Prevent writing to the partition table, boot record, and system files.

Files: Prevent programs from deleting or changing files with the extensions you specify in the Files list box.

System Areas and Files: Protect both system areas and files.

Entire Disk: Prevent any writes to the disk.

Allow Floppy Access: Override the selected protection when formatting a floppy disk so you can format without interruption.

Specify which files to protect in the two list boxes.

- **Files:** Protect files that have an extension listed in this box. The default extension list includes .COM, .EXE, .OVL, .BIN, and .SYS files. You can edit this list by selecting an extension, deleting it, then typing a new extension.
- **Exceptions:** Unprotect specific files that are otherwise protected by the Files list. The Exceptions list is empty by default, but you can add up to 20 specific filenames to unprotect. You cannot use wildcards in the Exceptions list.

On: Enable disk protection.

Off: Disable protection. Your choices remain in DISKMON.INI when disk protection is off so that you can easily enable protection by selecting On.

Cancel: Select to exit the Disk Protect dialog box without saving any changes.

If a write violation occurs while the computer monitor is in graphics mode, for example in a CAD application, desktop publishing application, or interactive game, the warning box will not appear. Instead, the write is rejected and your computer beeps. The application attempting the write may display a "write protect" or "access denied" error message.

If you use graphics applications that write to disks, it may be easier if you turn off disk protection before starting the application. Remember to turn disk protection on again after you leave the application. You can make a batch file to turn Disk Protect off, start the application, and resume Disk Protect, as in this example file:

```
REM    Turn off all disk protection.
DISKMON/PROTECT-
REM    Start your graphics application.
GRAPHICS.APP
REM    Turn disk protection back on.
DISKMON/PROTECT+
```

You don't need the above batch file for Microsoft Windows because Disk Protect automatically disables itself when you run Windows, and re-enables itself when you exit Windows.

Disk Light

When you select Disk Light from the Disk Monitor menu, the Disk Light dialog box explains the feature and lets you enable or disable it. After you enable it, the drive name flashes in the upper-right corner of your screen with every disk access, except when the monitor is in graphics mode.

Disk Park

Disk Park moves your disk's read-write heads to an area where they won't hit any tracks if they accidentally crash into the disk surface because of a sharp blow to the computer. For maximum safety, park your disk heads every time you shut off the

computer. Many disk drives automatically park their heads when the power goes off. If yours doesn't, or if you're not sure, you can use Disk Park to park them.

Turn your computer off immediately after selecting Disk Park. Don't enter any commands or select any options. Anything you do unparks the heads again.

CHAPTER

11 Disk Tools (DISKTOOL)

This chapter describes:

- How Disk Tools makes a disk bootable
- How to restore your disk after using the DOS RECOVER command
- Which error messages indicate that Disk Tools can revive a floppy disk
- What happens to a disk cluster when you mark it

What It Does

Disk Tools (DISKTOOL) is a set of four utilities that perform disk management and recovery operations: Make a Disk Bootable, Recover from DOS's RECOVER, Revive a Defective Diskette, and Mark a Cluster.

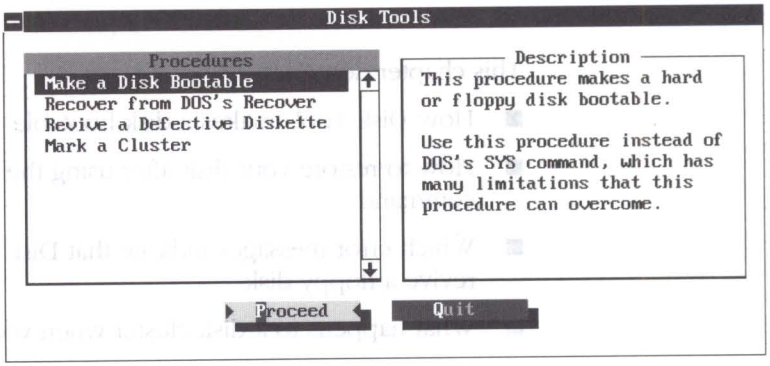
When to Use It

Use Disk Tools to make a disk bootable when it's been formatted as not bootable or is otherwise unable to boot; reverse the effects of using the DOS RECOVER command; revive a damaged floppy disk; and mark a disk cluster as usable or unusable.

How to Use It

Choose Disk Tools from the Norton Utilities main screen or type DISKTOOL at the DOS prompt. The Disk Tools dialog box in Figure 11-1 appears. Select the procedure that you need to perform.

Figure 11-1 Disk Tools dialog box


Disk Tools
Procedures
Make a Disk Bootable
Recover from DOS's Recover
Revive a Defective Diskette
Mark a Cluster
Description
This procedure makes a hard or floppy disk bootable.
Use this procedure instead of DOS's SYS command, which has many limitations that this procedure can overcome.
Proceed
Quit

You can also specify which procedure to perform from the command line. See Appendix C, "Command Line Reference," for more information on using Disk Tools from the command line.

The Disk Tools Utilities

The following section describes the four Disk Tools utilities.

Make a Disk Bootable: Makes any disk bootable, even if the DOS SYS command displays the error message "No room for system files." On a hard disk with no bootable partition, Disk Tools modifies the partition table to make the specified disk a boot disk. It also copies the DOS system files and command processor file to the disk.

Recover from DOS's Recover: Restores many of your disk's files to the state they were in before you ran the DOS RECOVER command. After the DOS RECOVER program repairs a disk with damaged sectors, it places all files in the root directory with computer-generated names. RECOVER does not recover files, unerase files, or restore original directories.

This Disk Tools procedure reconstructs subdirectories and their files. Files that originated in the root directory maintain the computer-generated names given by RECOVER.

If you have other problems with your disk, see Appendix B, "Troubleshooter," for a diagnosis and solution.

Revive a Defective Diskette: Revives a floppy disk when you receive any of the following DOS error messages: "General failure error," "Sector not found error," "Read fault error," or "Seek error." To revive a defective floppy disk, Disk Tools builds new physical format information; unlike a DOS format, however, you can still access the original data after formatting. This procedure makes a defective floppy disk usable again, but data may be lost from the defective areas of the disk.

Mark a Cluster: Marks a cluster as Bad, to prevent DOS from using it, or marks a cluster as Good, to allow DOS to use it.

CHAPTER

12 Diskreet (DISKREET)

This chapter describes using Diskreet to:

- Encrypt and decrypt individual files
- Create and configure NDisks
- Open, close, and use NDisks
- Load and configure the DISKREET.SYS device driver

What It Does

With Diskreet (DISKREET), you can encrypt important, confidential data so that it looks like nonsense to people who don't have the password to access it. It offers Fast Proprietary encryption, which is suitable for personal and corporate security needs.

Encryption depends on a *key*, an alphanumeric string that is used to encode the data in the encrypted file. You supply the key in the form of a password when the data is encrypted. You must supply the exact key, or password, each time you want to access the file; without it, the data in the file cannot be decrypted.

WARNING: If you forget the password for individually encrypted files or NDisks, there is no way to decrypt your data. Do not forget your password!

Diskreet provides two ways to protect your confidential data. You can select and encrypt individual files with their own passwords. Alternatively, you can create a virtual drive on one of your disks, hard or floppy, called an NDisk. An NDisk is actually a hidden DOS file that behaves like a disk drive. You can perform any file operation, such as create, copy, delete, and move, on an NDisk just like on a normal disk, but every file placed in it is automatically encrypted.

When to Use It

Use Diskreet in the following situations:

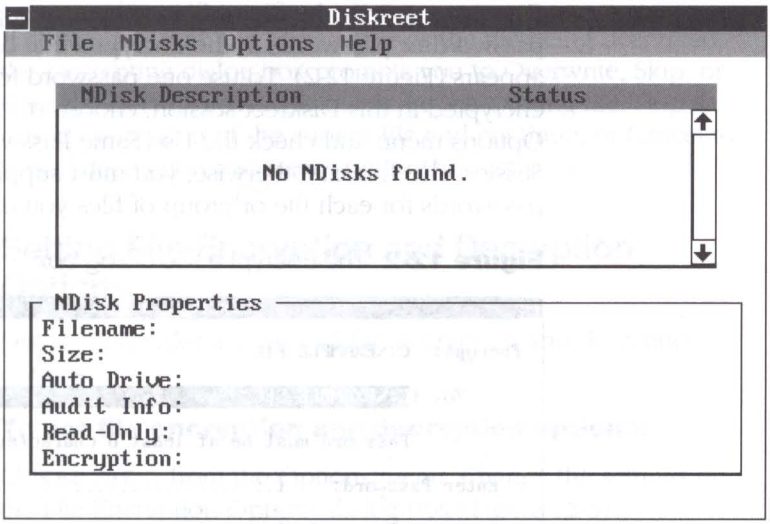
- Any time you store confidential files on disk.
- Whenever you send confidential data via telecommunications.
- Any time you want to protect against unauthorized access to your computer.

How to Use It

Diskreet consists of the DISKREET.EXE program and the DISKREET.SYS device driver. The DISKREET.EXE program is the interface to encrypting and decrypting files, setting system options, and editing NDisks. To work with NDisks, you must load the DISKREET.SYS device driver in your CONFIG.SYS file whenever you start your computer. DISKREET.SYS works with DISKREET.EXE to create, or mount, NDisks from hidden DOS host files. See "Loading the DISKREET.SYS Driver" later in this chapter for more information.

To use DISKREET.EXE, choose Diskreet from the Norton Utilities main screen, or type `DISKREET` at the DOS prompt. The Diskreet screen appears as shown in Figure 12-1.

Figure 12-1 The Diskreet screen



If the DISKREET.SYS driver was not loaded in CONFIG.SYS when you started your computer, a message appears, notifying you that "The Diskreet driver (DISKREET.SYS) has not been loaded...." Check the Disable This Message check box if you do not want the error message displayed even if the DISKREET.SYS driver is not loaded. Select OK to clear the message and finish loading Diskreet.

You can also enable or disable the Diskreet device driver, encrypt or decrypt files, and change NDisk settings from the DOS prompt. See Appendix C, "Command Line Reference," for more information on using Diskreet from the DOS Prompt.

Encrypting and Decrypting Files

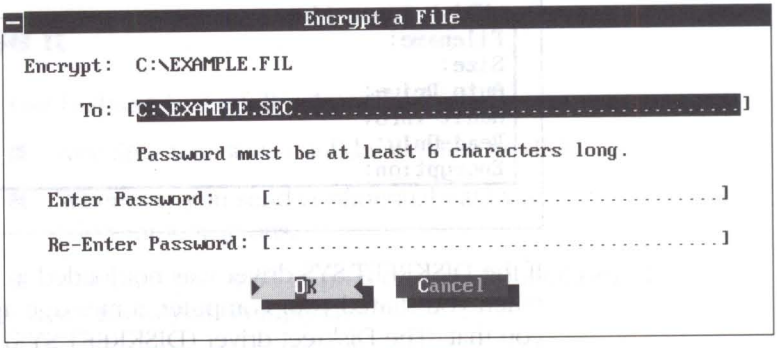
Use Diskreet to encrypt and decrypt individual files. Each file must have a password, although you can use the same password for multiple files. You can encrypt and decrypt files individually or in groups.

To encrypt a file:

Choose ENCRYPT... from the File menu. The Browse for Files to Encrypt dialog box appears where you specify the file or files to encrypt.

Once you specify the file or files, you must supply their password or passwords in the Encrypt a File dialog box that appears (Figure 12-2). To use one password for all files encrypted in this Diskreet session, choose FILE... from the Options menu and check the Use Same Password for Entire Session check box. Otherwise, you must supply different passwords for each file or group of files you encrypt.

Figure 12-2 The Encrypt a File dialog box



Enter a password of at least six characters in the Enter Password and Re-Enter Password text boxes, then select OK.

File combination and encryption progress boxes appear for every file encrypted. If the Confirm Successful Encryption/Decryption option check box is checked, a confirmation message appears (see the following section). When you select OK, the Wipe Original Files dialog box appears. You can delete the original, unencrypted files or preserve them. Also, checking the Disable This Message check box allows you to prevent the Wipe Original Files dialog box from appearing.

To decrypt a file:

To access the data in encrypted files, you must decrypt them first. Choose DECRYPT... from the File menu. In the Browse for a File to Decrypt dialog box, select the drive, directory, and

filename of the file to decrypt then select OK. Enter the password for the file in the Password dialog box and select OK.

If you entered the correct password, the encrypted file is decrypted. A decryption progress screen appears for every file you decrypted.

If a file exists with the same name as the file being decrypted, the Decrypting dialog box prompts you to Overwrite, Skip, or Cancel. Select Overwrite to overwrite the existing file, Skip to cancel decryption of the current file and continue, or Cancel to cancel decryption and return to the Diskreet screen.

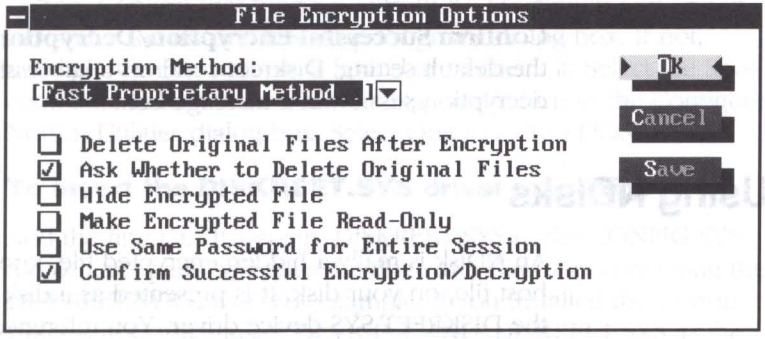
Setting File Encryption and Decryption Options

Diskreet provides a variety of file encryption and decryption options.

To set file encryption and decryption options:

Choose FILE... from the Options menu. Change the settings in the File Encryption Options dialog box (Figure 12-3).

Figure 12-3 The File Encryption Options dialog box



After changing the options, select OK to set the changes for the current Diskreet session, Save to save the settings, or Cancel to exit without changing the settings. The encryption and decryption settings are described below.

Encryption Method: The Fast Proprietary encryption method.

Delete Original Files After Encryption: When checked, Diskreet deletes and wipes the original, unencrypted files from the disk after encryption. Diskreet uses a proprietary wipe method to permanently remove the originals; they cannot be recovered even with UnErase or Disk Editor. The default setting is unchecked.

Ask Whether to Delete Original Files: When checked, the default setting, Diskreet prompts you to delete the original files after encryption.

Hide Encrypted File: When checked, Diskreet makes the encrypted file a hidden file by setting the DOS hidden attribute. This way, the file can't be seen by most DOS functions, such as DIR and DEL. The default setting is unchecked.

Make Encrypted File Read-Only: When checked, Diskreet sets the read-only attribute for the encrypted file so that it can't be deleted or changed by normal means. The default setting is unchecked.

Use Same Password for Entire Session: When checked, you use the same password for all the files in a session. You enter the password for the first file you encrypt or decrypt; from then on, the same password is used for all the files in the group. The default setting is unchecked.

Confirm Successful Encryption/Decryption: When checked, the default setting, Diskreet confirms a successful encryption or decryption session in a message box.

Using NDisks

An NDisk is really a hidden encrypted file, known as the NDisk host file, on your disk. It is presented as a disk drive to DOS by the DISKREET.SYS device driver. You reference NDisks by a drive letter, such as D: or E:, and when files are copied in it, they are automatically encrypted in real time. When you copy or move files out, they are decrypted automatically.

NDisks behave just like regular DOS disks as long as they are open. All file operations, such as creating, saving, copying, deleting, renaming, and so on, can be performed on NDisks. For example, to copy a file from the C: drive in an NDisk configured as the E: drive, type `copy c:\myfile.doc e:myfile.doc`.

When you close an NDisk, the files in it are inaccessible until you open the NDisk again by supplying the correct password.

You can have up to five NDisks open at once. However, you can have more than five NDisk host files as long as you have enough disk space to allocate them.

Loading the DISKREET.SYS Driver

To use NDisks, you must load the DISKREET.SYS driver, which requires 46K of RAM, in your CONFIG.SYS file when you boot your computer.

There are two ways to load the DISKREET.SYS driver in your CONFIG.SYS file: you can use the Norton Utilities Configuration program (NUCONFIG) to insert the DEVICE=path\DISKREET.SYS line, or you can use a text editor that can create ASCII files to insert the line manually.

To insert the DISKREET.SYS driver using NUCONFIG:

Choose Configuration from the Norton Utilities main screen, or type `NUCONFIG` at the DOS prompt. In the Configure Norton Utilities dialog box, select the Startup Programs command button. Confirm that the Start DISKREET Encryption Driver line has a checkmark in the Startup Programs dialog box. If not, highlight the line and press Spacebar to check it. Select the Save command button to save the settings and return to the Configure Norton Utilities dialog box. Select Quit to exit to DOS.

To insert the DISKREET.SYS driver manually:

Add the line DEVICE=path\DISKREET.SYS to the CONFIG.SYS file, where "path" specifies the drive and directory containing the DISKREET.SYS driver. For example, if you installed the Norton Utilities in C:\NU, insert DEVICE=C:\NU\DISKREET.SYS as the last line.

To load the device driver:

Restart your computer to load the DISKREET.SYS driver after inserting it in the CONFIG.SYS file. When DISKREET.SYS loads for the first time, the message in Figure 12-4 appears during startup. Thereafter, the driver loads completely without requiring your attention.

Figure 12-4 The Diskreet initial load message

```
DISKREET(tm)
Copyright 1992 by Symantec Corporation

No DISKREET config file to read (DISKREET.INI).
DISKREET's Main Password has been cleared.
Instant close keys have been reset to LEFT + RIGHT shift keys.
AUTO-CLOSE TIME-OUT interval has been set to five minutes and DISABLED.
Keyboard lock & screen blank has been DISABLED.
NDISK drive count set to one.

********************  PRESS ANY KEY TO CONTINUE  ********************
```

The first time you start Diskreet, the current setup is saved using the default values in a file called DISKREET.INI.

Loading DISKREET.SYS in Other Memory Areas

You can load DISKREET.SYS in two memory areas besides conventional memory: high DOS memory (also known as Upper Memory Blocks, or UMBs) and High Memory Area (HMA). In most cases, you want to load DISKREET.SYS in one of these memory areas instead of conventional memory, since it requires 46K of RAM.

The following list shows the types of memory available on various computers.

Computer	High DOS/UMB	HMA
80286	No	Yes
80386	Yes	Yes
80486	Yes	Yes

Since only one terminate-and-stay-resident program (TSR) or device drivers can use the HMA, it must be empty for DISKREET.SYS to load in it. Since many users configure recent DOS versions to load partly into HMA through the DOS=HIGH statement in CONFIG.SYS, DISKREET.SYS cannot load in it until you remove the DOS=HIGH statement. When DISKREET.SYS loads partly in the HMA, only 12K of conventional memory is used.

To load DISKREET.SYS in high DOS memory (UMB), you need a memory manager such as HIMEM.SYS or EMM386.EXE which are included with recent DOS versions. The memory manager's install line must be before the DEVICE=path\DISKREET.SYS. line in CONFIG.SYS. Your computer must also be a 80386 or 80486 with at least 1 MB of RAM. For most users, high DOS memory is the best place to load DISKREET.SYS since with some memory managers the device driver can automatically detect and load completely in a large enough region of high DOS memory.

DISKREET.SYS Load Options

The DISKREET.SYS driver has several load options which affect the way it works. The syntax of the optional command-line switches is as follows:

DEVICE=path\DISKREET.SYS [/S[KIPHIGH]] [/N[OHMA]] [/A[20ON]] [/Q[UIET]]

/SKIPHIGH	Keeps Diskreet from loading in an Upper Memory Block.
/NOHMA	Keeps Diskreet from using the High Memory Area, leaving it free for use by Windows or other programs.
/A20ON	This switch should be used only if you are encountering problems with your network drive, or are losing characters during serial communications.
/QUIET	Turns off the Diskreet warning message when starting Microsoft Windows 3.0 and 3.1 in Standard and Enhanced modes.

For example, the following line configures DISKREET.SYS to not use HMA and to turn the quiet mode on:

DEVICE=C:\NU\DISKREET.SYS /NOHMA /QUIET

See Appendix C, "Command Line Reference," for more information on DISKREET.EXE command-line options.

TIP: You can use the first letter of each command-line switch in lieu of the full name. For example, /N is equivalent to /NOHMA, and /A is the same as /A20ON.

Unloading DISKREET.SYS from Memory

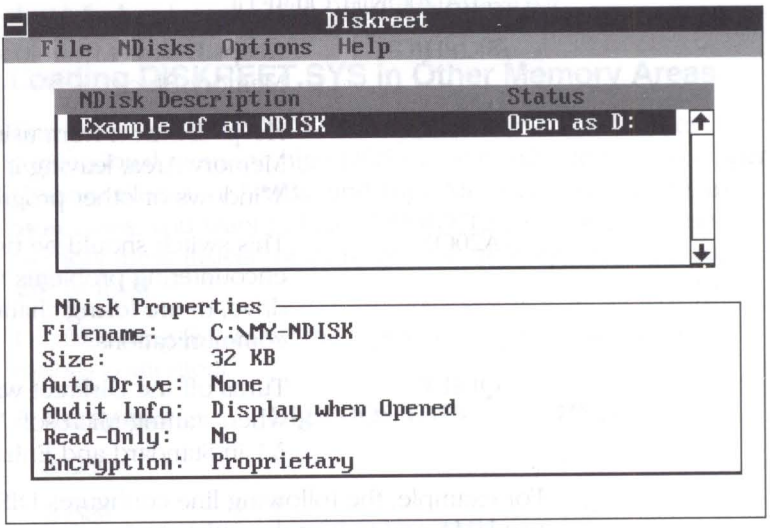
If memory is tight on your system with DISKREET.SYS loaded, you can remove it from memory when not working with NDisks.

Since DISKREET.SYS is a device driver, the only way to remove it from memory is to remove the DEVICE=path\DISKREET.SYS line from CONFIG.SYS, save the file, and reboot your computer.

NDisk Properties

All NDisks, open or closed, are listed in the Diskreet screen (Figure 12-5). NDisks on floppy disks are not displayed until you search for one using the SEARCH... command in the NDisks menu. See "Diskreet Menu Commands" later in this chapter for information on how to use the SEARCH... command.

Figure 12-5 NDisk properties



The highlighted NDisk in the NDisk list box is the focus of all NDisk actions such as open, close, delete, and edit. Use the UpArrow and DownArrow keys or click with the mouse to highlight an NDisk.

NDisk Description: The description (up to 30 characters) for the NDisk host file.

Status: Indicates whether the NDisk is open. If so, the drive letter for the open NDisk appears.

Filename: The drive and filename for the highlighted NDisk.

Size: The NDisk size in kilobytes.

Auto Drive: The drive letter automatically assigned by the Auto Drive option to the NDisk when it is opened, the time to prompt for the password, and the prompt method if these options are set on the Edit an NDisk dialog box.

Audit Info: The status of the Show Audit Info check box set by the EDIT... command in the NDisks menu. When checked, Display When Opened appears; otherwise Don't Display appears.

Read Only: The status of the Read-Only check box set by the EDIT... command in the NDisks menu. When checked, Yes appears; otherwise No appears.

Encryption: The encryption method set when you created the NDisk.

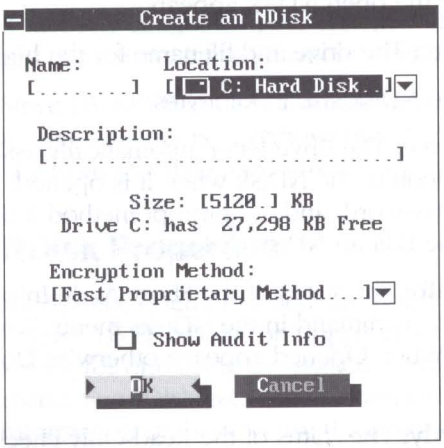
Creating an NDisk

Before you can use an NDisk, you must create the encrypted host file that becomes the NDisk. The host file can be anywhere in size from 32K to 32 MB, depending on the amount of data you keep in it. This host file is automatically created in the root directory of the disk you specify as filename.@#! where "filename" is the name of the NDisk. Diskreet attaches the @#! extension to the filename to distinguish it as an NDisk host file. You can create host files on any valid DOS disk except network drives, including compressed disks.

To create an NDisk:

Start Diskreet and choose CREATE... from the NDisks menu. The Create an NDisk dialog box appears as in Figure 12-6. Enter the name of the host file in the Name text box. Then, select the drive where the host file is to be created using the Location list box. You must enter a description of up to 30 characters for the NDisk in the Description text box.

Figure 12-6 The Create an NDisk dialog box



In the Size text field, enter the size of the NDisk in kilobytes. For example, for a 5 MB NDisk, enter 5120. Choose the encryption method from the Encryption Method drop-down list box. Check the Show Audit Info check box to see audit information for NDisk activity and select OK.

In the Set Password dialog box, specify the drive letter for the NDisk to use in the Assigned Driver Letter drop-down list box. For more information on assigning drives, see "Assigning Drive Letters to NDisks" later in this chapter. Enter a password in the Enter Password text box and re-enter it in the Re-Enter Password text box. Select OK to complete the NDisk creation.

If you checked the Show Audit Info check box in the Create an NDisk dialog box, the audit information dialog box for the new NDisk appears. Press any key to return to the Diskreet screen. The new NDisk is open and ready to use.

NOTE: Diskreet stores administrative information such as the file allocation tables (FATs) in each NDisk, which gives you less usable space. Thus, a 5120K NDisk has a 5120K host file with 120K used for the administrative information. This leaves 5000K for your files.

Opening and Closing NDisks

You can open and close NDisks manually; however, there are other ways to open and close NDisks:

- All NDisks are automatically closed when you shut off the power or restart your computer.
- You can define an NDisk to be opened automatically either during startup or the first time it is referenced.
- You can request that NDisks close automatically if they are not accessed for a specified number of minutes.
- You can set up a hotkey that closes all NDisks instantly.

This section describes the manual and automatic ways to open and close NDisks.

To manually open an NDisk:

Highlight the NDisk in the NDisk list box and choose OPEN... from the NDisks menu, or double-click it with the mouse. Select the drive letter for the NDisk from the Assigned Drive Letter drop-down list box in the Open an NDisk dialog box. Enter the password in the Enter Password text box and select OK.

If you enter the wrong password, the Error dialog box appears. Select OK to clear the dialog box. You must choose OPEN... again from the NDisks menu to open the NDisk.

If you enter the correct password, and the Show Audit Info option is on, the audit information dialog box appears and stays open until you press a key. The drive letter for the open NDisk appears in the Status column of the NDisk list box.

To manually close an NDisk:

Highlight the NDisk you want to close. Choose CLOSE from the NDisks menu and the NDisk closes. To close all open NDisks at once, choose CLOSE ALL from the NDisks menu. The Status column in the NDisk list box is labeled "Closed" and displays no drive letter.

Using Auto Drive to Open NDisks Automatically

Using the Auto Drive feature, you can configure NDisks to open automatically, either during startup or the first time you reference them. By default, the Auto Drive feature is off.

To configure the Auto Drive feature:

Highlight a closed NDisk and choose EDIT... from the NDisks menu. Enter the password for the NDisk in the Password dialog box and select OK. If the Show Audit Info option is checked, the audit information dialog box appears. Press any key to display the Edit an NDisk dialog box.

Select the drive letter to be assigned to the NDisk from the Auto Drive drop-down list box. Select the type of prompt for the NDisk from the Prompt drop-down list box: select Beep for an audio prompt only, Pop-Up for a dialog box prompt, and Automatic to have Diskreet choose the prompt method.

NOTE: When using the Beep prompt, you may hear different tunes. If Diskreet cannot display its audit information dialog box, a special tune indicates an access was attempted and failed.

Select the time for the prompt from the Prompt At drop-down list box. Select Boot to have the prompt appear when you start your computer, or First Access to have the prompt appear when you reference the NDisk for the first time. Select OK to save the settings and return to the Diskreet screen.

To disable the Auto Drive feature, select None in the Auto Drive drop-down list box.

Using Auto-Close Timeouts to Close an NDisk

To protect your open NDisks when you are not present, you should always close them when you leave your computer. You should also configure them to close automatically after a certain amount of keyboard inactivity, just in case you forget to close one. By default, the Auto-Close feature is off.

To turn the Auto-Close feature on:

Choose DRIVER... from the Options menu. If a master password has been set, the Master Password dialog box appears. Enter the master password and select OK.

Check the Auto-Close Timeout check box in the Driver Options dialog box to turn the feature on. The default timeout period is 5 minutes, but you can enter any value from 1 to 59 in the Min. text box. Choose OK to save the changes and return to the Diskreet screen.

When NDisks are closed through Auto-Close, the close is only temporary. The next time you reference any temporarily closed NDisk, you are asked for its password. When you enter the correct password for that NDisk, all temporarily closed NDisks are reopened, even if they have different passwords.

To disable the Auto-Close feature, uncheck the Auto-Close Timeout check box.

Using Quick Close All to Close an NDisk

Use the Quick Close All feature to instantly close all open NDisks by pressing a hotkey combination.

To turn Quick Close All on:

Choose DRIVER... from the Options menu. If the Master Password option is on, the Master Password dialog box appears. Enter the master password and select OK to display the Driver Options dialog box. See "Working with Passwords" later in this chapter for more information on setting up a master password.

Select the key combination from the Hot Key drop-down list box to activate the Quick Close feature. Check the Quick Close check box to set the feature on. Select OK to save the changes and return to the Diskreet screen.

NOTE: If the Keyboard/Screen Lock check box is checked, the same hotkey locks the keyboard and screen at the same time. For more information on this option, see the "Locking the Keyboard and Screen" section later in this chapter.

To use Quick Close All, press the hotkey. All your NDisks are instantly closed. This is a temporary closure. To reopen all

NDisks, reopen any one. If the keyboard and screen are locked, you must unlock them first by entering the master password.

Locking the Keyboard and Screen

You can configure Diskreet so that the keyboard and screen are locked and blanked using the hotkey configured with the Quick Close All feature.

You need to set up a master password for this feature to work; see "Working with Passwords" later in this chapter for more information on setting up a master password.

To lock the keyboard and screen:

Choose DRIVER... from the Options menu. In the Driver Options dialog box, check the Keyboard/Screen check box.

By default, Hot Key is defined as Both SHIFTs, or both shift keys pressed at once. You can change it to one of seven other key combinations. Select OK to save the change and return to the Diskreet screen.

When you press the hotkey combination, the screen blanks and the keyboard is locked. To display the screen and unlock the keyboard, you must enter the master password. If you enter a string of characters other than the master password, a beep sounds.

NOTE: If the Quick Close All feature is enabled, the same hotkey closes all open NDisks.

Using an NDisk

To use an open NDisk, reference its drive name at the DOS prompt. For example, use `copy c:\dbs\emp.db e:` to copy a file to the E: NDisk.

To access a file in an NDisk, open the NDisk. When the NDisk is open, you can access it just like a normal drive. To access a file, type the NDisk's drive letter and the filename. For example, `e:emp.db` accesses the file EMP.DB on an NDisk assigned to the E: drive letter. As long as the NDisk is open, Diskreet

automatically decrypts and encrypts data as needed to interact with any program that accesses files in the NDisk.

With NDisks, you can use DOS commands such as DIR, TYPE, and CHKDSK and Norton Utilities programs such as File Find, Norton Disk Doctor, Disk Editor, and Speed Disk. You can also create and manipulate a tree-structured directory system on an NDisk. However, low-level programs that work directly with the disk medium, such as the DOS FORMAT program, produce an "Invalid media type" or "Drive not ready" message.

Reading from and writing to the NDisk takes longer because of the encryption and decryption process. The time difference depends on the file size, the encryption method, and the speed of your computer.

By default, the NDisk host file is hidden to prevent you from accidentally deleting the NDisk. If you have an NDisk named DBDISK on drive D:, the DIR command does not show DBDISK as a filename. However, if you examine D:\ with Disk Editor, you can see the NDisk as a file but still can't delete it using normal delete commands.

If you receive a "Drive not ready--close door" message when you reference the drive, it is not assigned to an NDisk. A "Write protect" message means that the NDisk is write-protected; see "Editing NDisk Settings" later in this chapter for a discussion of NDisk write-protection.

Editing NDisk Settings

Once you have created an NDisk, you can change any of its parameters except the encryption method.

To edit NDisk settings:

Highlight a closed NDisk in the NDisk list box, and choose EDIT... from the NDisks menu. Enter the password in the Password dialog box and select OK. The Edit an NDisk dialog box appears. If the Show Audit Info feature is on, the audit information dialog box is displayed until you press a key.

Select and change the NDisk settings described below. Select OK to save the changes and return to the Diskreet screen. All changes take effect immediately.

For information on the Auto Drive, Prompt, and Prompt At options, see "Opening and Closing NDisks" earlier in this chapter.

Description: Enter a new description of up to 30 characters in the Description text box.

Size: Enter the new size from 100K to 32,768K (free disk space permitting) in the Size text box. You cannot resize an NDisk smaller than the data it contains. For example, if a 1000K NDisk contains 500K of data, you can resize it to 500K but no smaller. You may need to optimize the NDisk with Speed Disk before reducing it to its minimum size.

WARNING: A power loss while changing an NDisk's size could make all the existing data inaccessible. Always back up the NDisk before changing its size.

Show Audit Info: Check this check box to track and display audit information. When checked, the audit information dialog box appears whenever you open NDisks.

Read-Only: Check this check box to make the NDisk read-only. Write protection can protect the files from accidental damage or damage by a virus operating while the NDisk is open. To edit existing files or add more files to the NDisk, remove the write protection to make the changes, then restore it again.

Deleting and Wiping NDisks

You can delete an NDisk when it is no longer needed. For extra security, especially if you think the password has been discovered, don't just delete it—wipe it from the disk.

To configure an NDisk for wiping:

Choose GLOBAL... from the Options menu. The Global Options dialog box appears. Select Overwrite Once or Government Wipe (DOD Specification) from the Data Clearing Method drop-down list box. The default data clearing method is None; NDisks are not wiped during deletion by default. Select OK to save the changes and return to the Diskreet screen.

To delete and wipe an NDisk:

Highlight the NDisk to delete in the NDisk list box and choose DELETE from the NDisks menu. Enter the password in the

Password dialog box and select OK. Select Delete on the Delete an NDisk dialog box to delete the NDisk. The Wiping progress screen appears with the status of the wipe operation. When the NDisk is deleted and wiped, you return to the Diskreet screen. The NDisk you just deleted no longer appears in the NDisk list box.

WARNING: Deleting an NDisk is permanent! You cannot recover files contained in the NDisk, even with UnErase or Disk Editor.

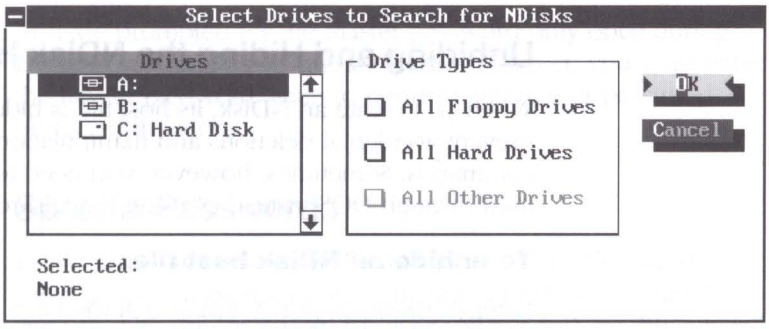
Searching for NDisks on Floppy Disks

When you start Diskreet, it displays all the NDisks on your local hard disks. To access NDisks on floppy disks or removable disks, such as Bernoulli cartridge drives, you use the SEARCH... command on the NDisks menu to find and add them to the NDisk list box.

To search for NDisks on other disks:

Choose SEARCH... from the NDisks menu. The Select Drives to Search for NDisks dialog box shown in Figure 12-7 appears. Select the disk or disks to search in the Drives scroll box. A checkmark appears next to selected drive letters.

Figure 12-7 The Select Drives to Search for NDisks dialog box



You can also select drives using the Drive Types group box. Check All Floppy Drives to search both the A: and B: floppy drives, All Hard Drives to search the local hard drives including compressed and other logical drives, and All Other Drives to search all other drives except network drives.

After selecting the disks to search for NDisks, select OK to begin the search. All NDisks found are added to the NDisk list box.

Assigning Drive Letters to NDisks

When you open an NDisk, you assign it a temporary drive letter. One drive letter might refer to several different NDisks at different times, and one NDisk might be called by several different drive letters over its lifetime.

When you first install Diskreet, only one drive letter is available, so you can open only one NDisk at a time. You must close one NDisk when you open another. To open more than one NDisk at a time, you can reserve up to five drive letters from the Driver Options dialog box.

To request additional NDisk drive letters:

Choose DRIVER... from the Options menu. If a master password is set, enter it in the Master Password dialog box. The Driver Options dialog box appears.

Select the number of drive letters you need from the Drive Letters to Reserve drop-down list box. Drive letters begin with the next letter in the alphabet after the current drive letter. For example, if you normally have the C: and D: hard drives, and one NDisk assigned as the E: drive, requesting three drive letters reserves two additional drive letters, F: and G:, in addition to the E: drive.

Unhiding and Hiding the NDisk Host File

When you create an NDisk, its host file is hidden from DOS to prevent accidental deletions and manipulations by DOS commands. Sometimes, however, you need to access the file itself through DOS instead of using the Diskreet drive letter.

To unhide an NDisk host file:

Enter `DISKREET /SHOW:drive` at the DOS prompt, where "drive" is the drive letter of the NDisk.

You should keep the file hidden at all other times. Hide it again by entering `DISKREET /HIDE:drive` at the DOS prompt.

Working with Passwords

Diskreet uses two levels of passwords: master and specific. The master password is used for general Diskreet functions such as unlocking the keyboard and screen and changing driver settings. Specific passwords protect NDisks and encrypted files.

The Master Password

When Diskreet is installed, no master password is set. To protect your system and your data, you should set the master password as soon as possible.

To set or change the master password:

Choose MASTER PASSWORD... from the Options menu. The Change Master Password dialog box appears. If you are setting the master password for the first time, enter and re-enter the new master password in the Enter New Password and Re-Enter New Password text boxes.

If you are changing an existing master password, enter the current password in the Enter Old Password text box. Then enter and re-enter the new password in the Enter New Password and Re-Enter New Password text boxes.

Select OK to save the new master password and return to the Diskreet screen. The new master password takes effect immediately.

You are prompted for the master password only once during a Diskreet session. If you exit and restart Diskreet, you must enter the master password again to perform any master password-protected functions.

Specific Passwords

Every NDisk and encrypted file has a password. You must provide the passwords to open an NDisk or decrypt a file. You can use the same password for every NDisk and file, but several passwords provide more security.

Your encrypted data is only as secure as your password. To prevent other people from guessing your passwords, avoid using your name or that of a close relative or friend, or your

birth date, phone number, social security number, and the like. On the other hand, choose passwords you can remember: your first-grade teacher's name or the town where your mother grew up are better than random groups of characters.

However, if your data is valuable enough for someone to spend time and effort trying to crack, random groups of characters make more secure passwords. If you must write your password down, store it in a secure place.

WARNING: If you forget a specific password for a file or NDisk, there is no way to recover it or the data encrypted in it.

You can change a password for an NDisk or individually encrypted files anytime.

To change the password of an encrypted file:

Decrypt the file and re-encrypt it with a new password. See "Encrypting and Decrypting Files" earlier in this chapter for more information on encrypting and decrypting files.

For maximum security, you should change each NDisk's password regularly to limit access in case someone discovers your password.

WARNING: Back up the entire NDisk before changing the password. A power loss during re-encryption could cause you to lose access to all your data.

To change the password of an NDisk:

Highlight the NDisk in the NDisk list box and choose PASSWORD... from the NDisks menu. The Set Password dialog box appears. Enter the current password in the Enter Old Password text box. Enter and re-enter the new password in the Enter New Password and Re-Enter New Password text boxes.

Quick, the default re-encryption method, does not re-encrypt the NDisk with the new password; only the password is changed. To re-encrypt the NDisk using the new password, select Secure in the Re-Encryption Type drop-down list box. For Secure

re-encryption, you must have at least two reserved drive letters. See "Assigning Drive Letters to NDisks" earlier in this chapter for more information on requesting more drive letters. Select OK to change the password.

Diskreet Menu Commands

This section describes the Diskreet pull-down menu commands.

The File Menu

ENCRYPT...: Encrypts a file or group of files.

DECRYPT...: Decrypts files encrypted with ENCRYPT....

EXIT: Quits Diskreet.

The NDisks Menu

OPEN...: Opens the currently highlighted NDisk in the NDisk list box. You need to enter the correct password for the NDisk when prompted for it.

CLOSE: Closes the currently highlighted NDisk in the NDisk list box.

CLOSE ALL: Closes all open NDisks.

CREATE...: Creates a new NDisk.

EDIT...: Edits the highlighted NDisk in the NDisk list box. You need to enter the correct password for the NDisk when prompted for it. If the highlighted NDisk is open, a dialog box prompts you to close it before prompting you for the password. You must close the NDisk before you can edit its parameters.

PASSWORD...: Changes the password for the highlighted NDisk in the NDisk list box. If the highlighted NDisk is open, you are prompted to close it before being prompted for the password. You must close the NDisk before you can change its password.

DELETE: Deletes the highlighted NDisk in the NDisk list box. If the master password is set, you must enter it first.

SEARCH...: Searches for NDisks on the drives you select.

The Options Menu

DRIVER...: Sets general options related to the DISKREET.SYS device driver.

FILE...: Configures parameters for encrypting and decrypting individual files.

GLOBAL...: Configures the Data Clearing Method and the "Driver not loaded" warning.

MASTER PASSWORD...: Sets or changes the master password.

CHAPTER

13 Duplicate Disk (DUPDISK)

This chapter explains using Duplicate Disk to:

- Copy a floppy disk
- Make multiple copies of a single floppy disk
- Format a floppy disk before copying to it

What It Does

Duplicate Disk (DUPDISK) makes an exact copy of a floppy disk on another floppy disk of the same capacity. Duplicate Disk also copies the DOS system files and other hidden files, if present, as well as the volume label. Unlike the DOS DISKCOPY command, you swap disks only once when using a single floppy drive. For multiple copies of the same disk, Duplicate Disk saves you even more time because it holds the disk contents in memory rather than rereading the disk for each copy made.

NOTE: Duplicate Disk cannot copy a floppy disk to a different disk size or capacity; for example, a 5 ¼-inch disk to a 3 ½-inch disk or a 1.2 MB disk to a 360K disk.

When to Use It

Use Duplicate Disk to make one or more exact copies of a floppy disk. It copies a disk, called the *source*, to another disk (or disks) of the same capacity, called the *target*. If the target disk is not formatted, Duplicate Disk can format the target disk

during the copy operation. You can also use Duplicate Disk to copy a floppy disk containing the DOS system files.

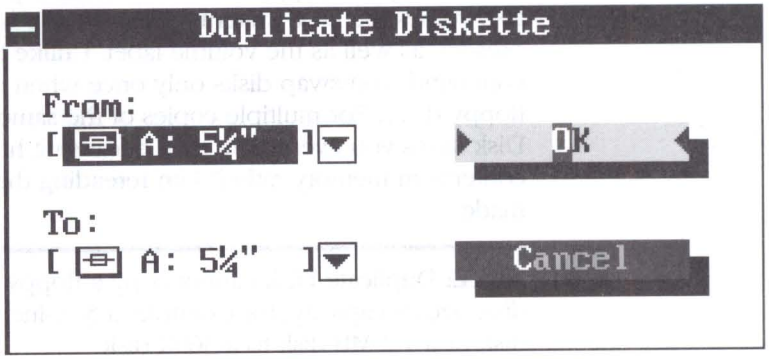
WARNING: Duplicate Disk overwrites the existing contents of the target disk so you *cannot* recover them by any means. Do not use a target disk with any data on it that you want to keep.

TIP: To fix an error on a floppy disk, make a copy with Duplicate Disk, then work on the copy. This way, you can make another copy and try again if the results are not what you expected.

How to Use It

Choose Duplicate Disk from the Norton Utilities main screen, or type `DUPDISK` at the DOS prompt. The Duplicate Diskette dialog box appears as illustrated in Figure 13-1.

Figure 13-1 The Duplicate Diskette dialog box.



Select the source floppy disk drive in the From drop-down list box. If you have more than one floppy drive, press Ctrl+DownArrow to drop down the From list box or just type the drive letter.

Select the target floppy disk drive in the To drop-down list box. If your computer has two floppy disk drives of different capacities or only one floppy disk drive, the To list box is

automatically set to the same drive as the source floppy disk drive.

NOTE: You can use command-line switches to specify the source and target drives. See Appendix C, "Command Line Reference," for more information.

Select OK to start the copy operation. A prompt box appears asking you to insert the source floppy disk into the designated drive. Insert the source disk, then select OK.

If you are using the same drive for the source and the target, the source floppy disk is read into memory. A prompt box instructs you when to insert the target floppy disk. If you have a dual-floppy computer *and* both drives have the same capacity, insert the target floppy disk in the other floppy disk drive. A message box reports on the status of the copy operation.

When the copy completes, you are asked if you want to make another copy of the same floppy disk. Select Yes if you want to make another copy. Duplicate Disk prompts you to insert another target floppy disk.

TIP: To copy a floppy disk to a different capacity disk, use the DOS COPY command or the DOS XCOPY command with the /S switch, if the source disk contains subdirectories. Make sure that the target disk has sufficient capacity to hold the data from the source disk. Remember that the DOS COPY and XCOPY commands will not copy hidden or system files.

To make the target disk created with COPY or XCOPY a bootable disk (one that will start your computer), use Disk Tools to make the disk bootable. See "Repairing Disks with Disk Tools" in Chapter 3, "Recovery Tutorials," for the procedure to make a disk bootable.

NOTE: A small operational difference exists between Duplicate Disk and the DOS DISKCOPY command. Beginning with DOS version 4.0, DOS creates a unique volume serial number for each disk when it is formatted with the DOS FORMAT command or copied with the DOS DISKCOPY command. Duplicate Disk does not change the volume serial number from the source to the target.

CHAPTER

14 File Attributes (FA)

This chapter describes:

- The DOS file and directory attributes
- How to determine which attributes are set for a file or directory
- How to set and clear file and directory attributes

What It Does

You can use File Attributes (FA) to display, set, or clear any of the four file attributes—archive, read-only, hidden, and system. File Attributes can also change a directory's hidden attribute.

Whenever DOS creates a file, it also creates a directory entry that contains various facts about the file. Some of that information (such as the file's size and creation date and time) is listed when you use the DOS DIR command.

However, the DOS DIR command does not show all the file information. In particular, DOS maintains a field in each file's directory entry that tells which of the four attributes have been assigned to the file. A file can have from none to all four of these attributes assigned.

Archive: Indicates that a file needs to be backed up. DOS sets the archive attribute whenever it creates or modifies a file; the DOS BACKUP command (and other backup utilities such as Norton Backup) clears the archive attribute.

Read-Only: Protects a file from being changed or deleted; use it to guard a file from accidental erasure or modification.

Hidden: Makes critical system files harder to access and delete. Hidden files do not appear in the standard DOS DIR listing, hidden program files cannot be executed, and hidden data files cannot be accessed by most applications. Two DOS files,

IBMBIO.COM and IBMDOS.COM (or MSDOS.SYS and IO.SYS), are hidden and do not show up in directory listings.

File Attributes can set or clear the hidden flag on a directory, subdirectory, or group of subdirectories. It cannot, however, set other attributes for directories and subdirectories, even if you include the appropriate command-line switches.

System: Indicates a DOS or system-related file. Files with the system attribute do not appear in the standard DOS DIR listing and are difficult to access and delete.

CAUTION: The protection provided by the read-only, hidden, and system file attributes is limited: Norton Commander and other DOS shells can still easily delete files with these attributes set.

When to Use It

Use File Attributes to protect files from being overwritten and from accidental deletion. File Attributes can also hide files or display hidden files, and can keep track of important files that have been modified so that you can make regular backups of them, or control which files will be backed up together.

How to Use It

To display file attributes for the current directory, choose File Attributes from the Norton Utilities main screen or type FA at the DOS prompt. To set file attributes for a specific file or directory, use the following syntax:

FA [pathname] [/A[+ | -]] [/R[+ | -]] [/HID[+ | -]] [/SYS[+ | -]] [/CLEAR] [/P] [/S] [/T] [/U]

FA [pathname] [/DIR [+ | -]]

The File Attributes command-line switches are described in the following section.

Command-Line Switches

pathname	Specify the drive, directory name, and filename of the file to set, clear, or display. You can use the DOS wildcard characters ? and *.
/A /R /HID /SYS	Specify one or more attribute to set, clear, or display. Specify /A for archive, /R for read-only, /HID for hidden, and /SYS for system.
	Follow the switch with a + (plus sign) to set the attribute, or a - (minus sign) to clear it. To display a specified attribute without changing it, include the switch without a plus or minus sign; for example, `FA c:\text /a` will display all files in the TEXT directory with the archive attribute set.
	Do not use the same attribute switch twice in a command line, once to display files with that attribute set and again to clear the attribute for those files. Only the first instance of the switch will be acted upon. Following an attribute switch with a minus sign will display the corresponding files *and* clear the attribute.
/P	Pause each full-screen file display. Press any key except Esc to resume the display (Esc terminates the display).
/S	Set or clear the specified attributes for all files in a directory and its subdirectories.
/T	Display only the total number of files or directories whose attributes are changed, without listing the individual filenames and their attributes.
/U	Display unusual files for which any of the four file attributes are set; files with no set attributes do not appear in the display.
/CLEAR	Clear all attributes for the specified file or files.

/DIR	Set or clear the hidden flag on a directory, subdirectory, or group of subdirectories. This switch behaves like /HID but acts on directories only; the directory's files are not affected.

NOTE: Using multiple attribute switches displays only files that have *all* specified attributes. Files missing any of the specified attributes are not displayed.

CAUTION: Making data files read-only can sometimes interfere with the applications that work with those files.

Examples

To list all files in the current directory with the system attribute, type:

```
FA /SYS
```

To hide all files with the .DOC extension in the current directory, pausing at each full-screen display, type:

```
FA *.doc /HID+ /P
```

To hide all files in the current directory and its subdirectories, type:

```
FA /HID+ /S
```

The /S switch causes File Attributes to operate on both the current directory and all its subdirectories.

To hide the DATA directory, type:

```
FA \data /DIR+
```

To protect all program files from accidental erasure by assigning them the read-only attribute, type:

```
FA \*.com /S /R+
FA \*.exe /S /R+
```

Be aware that making program files read-only can interfere with the applications that use those files.

CHAPTER

15 File Date (FD)

This chapter tells you how to:

- Set the current time and date stamp for a file or group of files
- Enter a new time and date stamp for a file or group of files

What It Does

Whenever you create or modify a file, DOS assigns it the date and time of its origin or last change. These are known as the file's date stamp and time stamp, respectively, and appear with the file's name in the DOS DIR directory listing. Use File Date (FD) to set, update, or clear the date or time stamp of any file or group of files.

When to Use It

Use File Date to assign more recent date stamps to files used by a compiler's MAKE utility. Modifying date and time stamps is also quite useful if you use a backup program that backs up files based on their date and time stamps.

How to Use It

To set the current date and time stamps to a file or group of files, choose File Date and specify a pathname from the Norton Utilities main screen. Or, type `FD pathname` at the DOS prompt using the following syntax:

```
FD pathname [/D[[:]date]] [/T[[:]time]] [/P] [/S]
```

To use File Date you must provide at least a pathname—the File Date help screen appears if you run File Date with no parameters. If you specify a drive only, all files in the current directory of that drive are set to the current date and time. If you specify a drive and a directory, all files in that directory are set to the current date and time.

The File Date command-line switches are described in the following section.

Command-Line Switches

pathname	Specify the drive, directory, and filename you want the new date and time stamps to affect. You can use the DOS wildcard characters * and ?.
/D[[:]date]	Change the date stamp of the specified file. Include the date parameter to specify a particular date. For added clarity, separate the /D switch and the date you specify with an optional colon. Use the form mm-dd-yy (month, day, year) for the date parameter. The date format you enter is dependent on the country in which File Date is used. You can use dashes or forward slashes to separate the month, day, and year when entering date parameters; dashes are recommended, however, since slashes are command-line switch characters.
/T[[:]time]	Change the time stamp of the specified file. Include the time parameter to specify a particular time. For added clarity, separate the /T switch and the time you specify with an optional colon. Use the form hh:mm:ss (hour, minute, second) for the time parameter, and specify the hour in 24-hour time format.
/P	Pause each full-screen File Date display. Press any key except Esc to resume the display (Esc terminates the display).

/S	Set the date and/or time stamp for all files in a directory and its subdirectories.

NOTE: If you use the /D and /T switches and their parameters without specifying a filename, File Date sets the current date and time for all files in the current directory. If you specify a pathname but omit both the /D and /T switches, File Date sets the current date and time for all files that match the pathname specification. Finally, if you use the /T switch without a time parameter, File Date sets the time to the current time for all files that match the pathname specification. If you use the /D switch without a date parameter, File Date sets the date to today's date.

Examples

To set the current date and time to the file WORK.TXT in the MYWORK directory on drive C:, type:

```
FD c:\mywork\work.txt
```

To set the current date and time to all files in the MYWORK directory and its subdirectories, type:

```
FD c:\mywork /S
```

In this example, entering the directory name alone is the same as using the file specification *.*.

To assign the date November 3, 1992, and the time 6:50 P.M., to the file WORK.TXT in the MYWORK directory on drive C:, type:

```
FD c:\mywork\work.txt /D11-03-92 /T18:50:00
```

CHAPTER

16 File Find (FILEFIND)

This chapter describes using File Find to:

- Find a file when you remember its contents but can't remember its name
- View the contents of the files you locate
- Replace text within a file or group files

What It Does

File Find (FILEFIND) locates files by searching through all the drives (including network drives) and directories on one or more disks. File Find also finds hidden and system files not displayed by the DOS DIR command, and creates batch files that operate on the files it finds.

With File Find, you can perform a simple file search using the standard DOS wildcard characters * and ?. You can also perform an advanced search by specifying a files date, size, attributes, and, if you are attached to a network, owner information. You can exclude files that don't match your custom specifications.

When to Use It

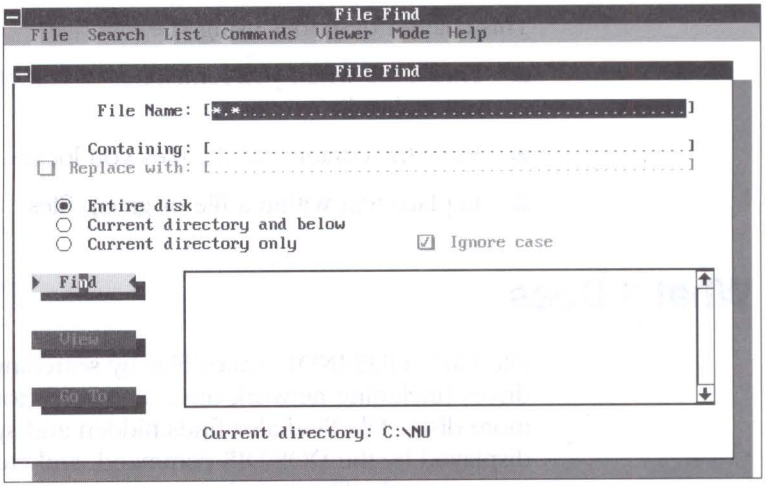
Use File Find when you need to access files but don't know where they are located. You can also find a file when you know some of the text it contains but can't remember its filename. In addition, you can limit a search to files with particular date stamps, time stamps, or attributes.

Once File Find locates a group of files, you can change their attributes, date stamps, or time stamps. File Find also includes a search and replace feature that lets you replace text contained in one or more files.

How to Use It

Choose File Find from the Norton Utilities main screen or type FILEFIND at the DOS prompt. The File Find screen appears, with the File Find dialog box open (Figure 16-1).

Figure 16-1 The File Find screen



You can also specify files to search for and change directly from the DOS prompt. See Appendix C, "Command Line Reference," for a description of the File Find command-line switches.

To find a file using File Find:

If you know the filename, enter it in the File Name text box on the File Find screen. If you don't know the filename but know some of the file's contents, enter a text string in the Containing text box. You can uncheck the Ignore Case check box to make the text search case-sensitive (it's checked by default).

TIP: Text searches are more likely to succeed if you limit search strings to single key words. If a text string includes any punctuation or spaces, File Find may not find it because of the way the text is formatted. For example, a word processor with automatic word wrap might insert a carriage return between two words.

Select the appropriate option button to specify where File Find should search for the file: the entire disk, the current directory and its subdirectories, or the current directory only.

Select the Find command button to begin the search. As the search progresses, matching files appear in the list box. The total number of files found appears in the lower-left corner of the screen. Select Stop or press Esc to terminate a search before it completes.

If the file you are looking for is located during the search, you can exit File Find directly to the directory containing the file by highlighting the filename in the list box and selecting the Go To command button.

To view the contents of a file:

Highlight a file in the list box and select View to display the file's contents. The display is in ASCII format by default; choose VIEW HEX from the Mode menu to display the file in hexadecimal format. If you specified a search string in the Containing text box, the matching text is highlighted in the display.

You can view files during a long search by pressing UpArrow or DownArrow, or by clicking the mouse in the list box. The files in the list box stop scrolling so that you can select one to view, while the actual search continues in the background.

To replace text within a file or group of files:

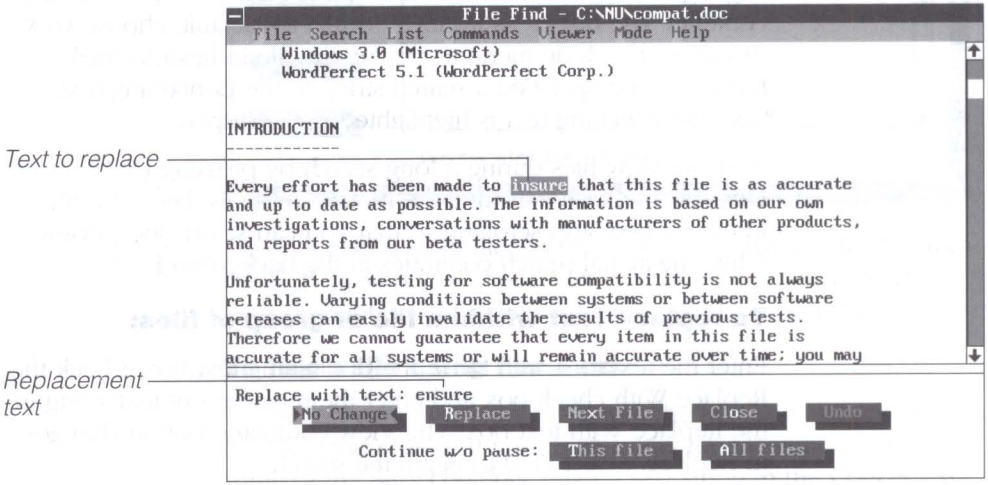
Enter the text to search for in the Containing text box. Check the Replace With check box and enter the replacement text string in the Replace With text box. The View command button changes to Replace. Select Find to begin the search.

TIP: If you intend to search a number of files for a common, nondistinctive word that could be part of another word, its wise to narrow the search to just the full word before you begin. Otherwise, you could search for files containing the word "form" and end up with files containing the words "performance," "formula," and so on. Before you start the search, choose ADVANCED SEARCH... from the Search menu and select Full Word from the Find As drop-down list box.

After the search, all files with matching text appear in the list box. The number of occurrences of matching text appears to the right of each filename. Highlight the first file you want to replace text in and select the Replace command button. The file's contents are displayed, with the first instance of matching text highlighted (Figure 16-2). Select one of the command buttons at the bottom of the screen to proceed.

NOTE: You can replace matching text during a long search by pressing UpArrow or DownArrow, or by clicking the mouse in the list box. The files in the list box stop scrolling so that you can select one to work in, while the actual search continues in the background.

Figure 16-2 The File Find search and replace display


File Find - C:\NU\compat.doc
File Search List Commands Viewer Mode Help
Windows 3.0 (Microsoft)
WordPerfect 5.1 (WordPerfect Corp.)
INTRODUCTION
Every effort has been made to insure that this file is as accurate and up to date as possible. The information is based on our own investigations, conversations with manufacturers of other products, and reports from our beta testers.
Unfortunately, testing for software compatibility is not always reliable. Varying conditions between systems or between software releases can easily invalidate the results of previous tests. Therefore we cannot guarantee that every item in this file is accurate for all systems or will remain accurate over time; you may
Text to replace
Replacement text
Replace with text: ensure
No Change
Replace
Next File
Close
Undo
Continue w/o pause:
This file
All files

No Change: Move to the next instance of matching text without changing the current one. This button changes to Stop when you perform a search and replace operation on a file or files using the This File or All Files command button.

Replace: Change the currently highlighted matching text and move to the next instance.

Next File: Move to the first instance of matching text in the next file in the list, without changing any remaining matching text in the current file.

Undo: Change the last instance of replaced text back to the original search text. You can undo up to 1000 replacements for each file in the list using this command button.

Close: Terminate the replace operation and return to the File Find screen. If you replaced any text in the current file, a confirmation message appears asking if you want to save the changes. Select OK to save the file with all changes, or Cancel to return to the current file. You can select Close in the midst of a replace operation without changing any remaining matching text in the current file.

NOTE: Press Esc during a search and replace to abandon any changes to the file and terminate the operation. A confirmation box appears asking if you're sure you want to abandon the changes.

This File: Replace all instances of matching text in the current file without pausing at each instance. After all the text in the file is replaced, you are prompted to go to the next file in the list or return to the File Find screen. Whichever option you choose, you must confirm or abandon the changes you made to the current file. Select OK to save the changes or Cancel to abandon them. To terminate the procedure before it completes, select Stop or press Esc.

All Files: Replace all matching text in all files in the list box. When you select this command button, a confirmation box appears asking if you really want to replace the matching text in all of the files. Select OK to proceed or Cancel to abandon the operation. If you proceed, a message appears to inform you when the search and replace operation completes. To terminate the procedure before it completes, select Stop or press Esc.

CAUTION: Do not select All Files unless you're absolutely certain that you want to replace the matching text in all files found and (if the search is still in progress) in any files that have yet to be found. You will only be prompted to confirm the changes before the procedure begins, *not* on a file-by-file basis.

Use the Viewer menu commands to move between files and matching text occurrences during a search and replace. See "File Find Menu Commands" below for descriptions of these commands.

File Find Menu Commands

For more control both during and after a search, use the commands in the File Find pull-down menus.

The File Menu

DRIVE...: Change to a specified drive.

DIRECTORY...: Change the current directory.

EXIT: Quit File Find.

The Search Menu

SEARCH DRIVES...: Select multiple drives to search. If you always want to search the same drives, you can save your choices.

ADVANCED SEARCH...: Specify multiple search criteria. Searches can be performed by file date, size, attribute, or, for network searches, owner. You can also narrow a text search by specifying how much of a search string to look for: all matching text (including partial words), the full search string only, or prefixes or suffixes only.

HEX STRINGS...: Search for (and optionally replace) hexadecimal strings within a file.

MAKE BACKUP FILES: Make backup copies of all files changed during a search and replace. The backup files retain the original filenames, but the file extensions are preceded by a curly brace ({). For example, the backup file for WORK.DOC would be named WORK.{DO.

TIP: Choose MAKE BACKUP FILES *before* you begin a search and replace operation. That way you can restore any files you made changes to that you later regret.

The List Menu

SET LIST DISPLAY...: Specify how to display found files, including the amount of file information shown, the sort criterion, and the sort order.

PRINT LIST...: Print the list of found files to a printer or file after a search completes. You can specify the amount of file and summary information to print, including the number of occurrences of search text in each file, the total number of files listed per directory and the total disk space they use, and the totals for the entire list.

CREATE BATCH...: Create a batch file to perform selected operations on the list of found files after a search completes. Specify the name of the batch file, the commands to be performed on the files, and additional parameters for those commands (for example, the COPY command before the found files and A: after them would copy them all to a floppy disk). You can also specify which commands to perform on the listed directories.

The Commands Menu

SET ATTRIBUTES...: Set or clear a combination of file attributes for the selected file or group of files.

SET DATE/TIME...: Set the date and/or time stamp for the selected file or list of files. The current date and time is the default.

TARGET FIT...: Determine if the found files will fit onto a target drive.

The Viewer Menu

PREVIOUS MATCH: Find the previous instance of matching text (search and replace only).

NEXT MATCH: Find the next instance of matching text (search and replace only).

PREVIOUS FILE: View the previous matching file. This command is available only after files have been found.

NEXT FILE: View the next matching file. This command is available only after files have been found.

The Mode Menu

SEARCH: Return to the File Find screen.

VIEW ASCII: View a file's contents in ASCII text format.

VIEW HEX: View a file's contents in hexadecimal format.

CHAPTER

17 File Fix (FILEFIX)

This chapter describes:

- Which types of application files File Fix can repair
- Which repair mode to choose for a damaged file
- Which application versions File Fix supports

What It Does

File Fix (FILEFIX) diagnoses problems in damaged dBASE, Clipper, Excel, Lotus 1-2-3, Quattro Pro, Symphony, and WordPerfect data files. It then examines the file, rebuilds an error-free copy, and recovers as much data as possible.

File Fix checks your disk for cross-linked files or any other errors in the file allocation table and directory area. If you have problems with your disk, an error message appears when you attempt to fix a file and recommends that you run Norton Disk Doctor on the disk that contains the file.

File Fix supports Lotus 1-2-3 versions up to and including 3.1; Symphony versions 1.0 and 1.1; dBASE III, III PLUS, and IV; Excel versions 3.0 and 4.0; WordPerfect versions 5.0 and 5.1; and any products that use identical data formats to these applications. Check the Norton Utilities READ.ME file for any additional compatibility information.

When to Use It

Use File Fix when you have damaged or unopenable dBASE, Clipper, Excel, Lotus 1-2-3, Quattro Pro, Symphony, WordPerfect, or data files compatible with these applications. However, your file may be unopenable due to a damaged disk,

so you should first run Norton Disk Doctor on your disk to see if that corrects the problem.

You can also use File Fix to restore records in a dBASE file that have been deleted with the ZAP command.

NOTE: If the damaged file has zero bytes or was overwritten by another file of the same name, choose the FOR DATA TYPES... command from the UnErase Search menu and select Lotus 1-2-3 and Symphony in the dialog box that appears. This allows you to find and reassemble original Lotus 1-2-3 and Symphony data file fragments. See Chapter 34, "UnErase (UNERASE)," for details.

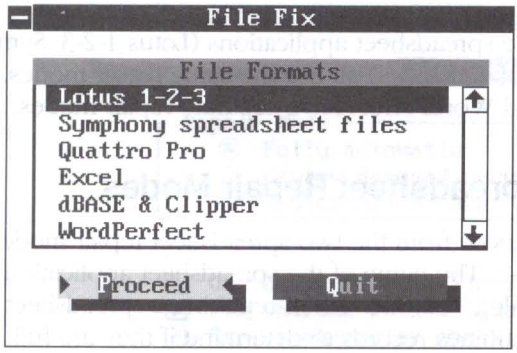
WARNING: If you have erased files that you need to recover, save the new fixed files to another drive or use UnErase to recover your erased files before using File Fix. This will ensure that you don't overwrite any erased files with files repaired by File Fix.

How to Use It

Choose File Fix from the Norton Utilities main screen or type `FILEFIX` at the DOS prompt. The File Fix dialog box in Figure 17-1 appears.

As a shortcut, you can type `FILEFIX` followed by the name of the damaged file at the DOS prompt. File Fix automatically determines the type of the file you are fixing by its extension (except for WordPerfect files, which can have any extension). See Appendix C, "Command Line Reference," for more information.

Figure 17-1 File Fix dialog box



Choose a File to Repair

After choosing the application that created your file, a dialog appears for you to select your damaged file.

File: Type the path and name of the file you want to repair in this text box, or use the Drive, Directories, and Files list boxes to locate and select the file. This box begins with an asterisk, a dot, and a file extension (an asterisk-dot-asterisk for WordPerfect files). Replace the asterisk with the name of your file and adjust the extension as necessary.

Drive: Select the drive from the drop-down list box that contains your damaged file.

Path: Displays the drive and directory currently selected.

Directories: Select the directory from the list box that contains your damaged file.

Files: Select your damaged file from the list box.

OK: Select to begin the repair when your damaged file appears in the File text box.

Cancel: Select to quit File Fix without repairing your file.

When you select OK, a dialog box appears with the title and content reflecting the target application. You must select a name and a repair mode to fix your file. The different types of applications have different repair modes as described below.

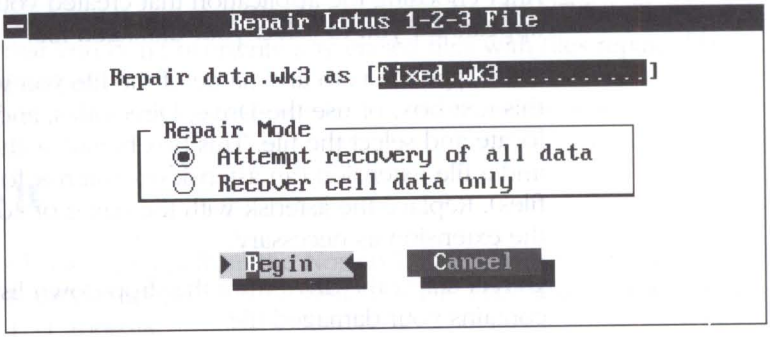
Repair Modes

The spreadsheet applications (Lotus 1-2-3, Symphony, Quattro Pro, and Excel) all use the same repair modes. However, dBASE and WordPerfect have separate repair modes.

Spreadsheet Repair Modes

Choose from the two spreadsheet repair modes shown in Figure 17-2. The name of the spreadsheet application appears in the dialog box title. When repairing a spreadsheet file, File Fix examines records to determine if they are full, valid, have legal length, and that their data are within legal ranges.

Figure 17-2 Repair Lotus 1-2-3 File dialog box



The spreadsheet repair modes are described below.

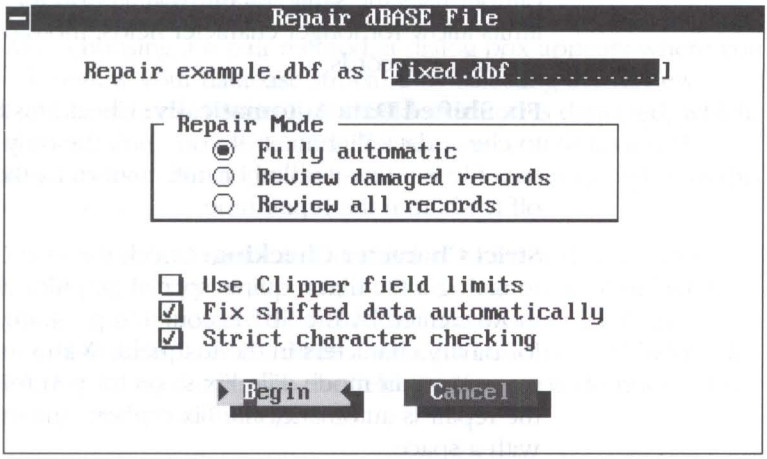
Attempt Recovery of All Data: Performs an automatic recovery on the file. Use this procedure first because it reconstructs the entire file including column widths, printer settings, range names, and graphic settings.

Recover Cell Data Only: Use this mode only if Attempt Recovery of All Data did not work, because this mode recovers cell data only. The spreadsheet cannot read the resulting file. You can only view and save the raw data.

Database Repair Modes

Both the dBASE and Clipper applications use the same repair method. Damage may exist to the database records, the file header, or both. The dBASE repair modes are shown in Figure 17-3.

Figure 17-3 Repair dBASE File dialog box



Fully Automatic: Repair files automatically. Always use Fully Automatic first because it quickly saves all valid data to the fixed file. Use one of the other two repair modes for recovery from records too damaged for automatic recovery.

Review Damaged Records: Reconstruct damaged dBASE file headers that are too damaged for the Fully Automatic mode, and stop at records damaged beyond logical repair. You can manually edit fields using the options shown in Figures 17-4 and 17-5.

Review All Records: View, accept, reject, and manually repair each record within a file. You control the repair process record by record using the dialog box shown in Figure 17-5. File Fix still does some automatic header and record repair.

NOTE: If you see a message indicating that the damaged file has zero records, the file may have been zapped with the dBASE ZAP command. With File Fix you can quickly unzap the file or restore its deleted records.

The three options in the Repair dBASE File dialog box help File Fix repair your database file more efficiently (see Figure 17-3). Verify that each has the appropriate setting for the type of file you are repairing.

Use Clipper Field Limits: Check this box for Clipper files. Clipper uses the same data format as dBASE. However, Clipper limits allow for longer character fields, more fields per record, and larger records.

Fix Shifted Data Automatically: Check this box in most cases to check data alignment. If you think the only problem with the data file is a few garbled or null characters, then turn this switch off to shorten the repair time.

Strict Character Checking: Check this box unless you are repairing a file that requires special graphics characters such as those created by the SBT accounting program. File Fix checks for binary characters in the text field. With this option on in manual repair mode, File Fix stops for you to view the record. If the repair is automatic, File Fix replaces the incorrect character with a space.

The number of database fields that File Fix can handle equals the number of fields permitted by the version of dBASE that created the file. Here are the limits for different versions:

Version	Fields
dBASE III, III+	128
dBASE IV	256
Clipper	1024

File Fix can handle the same record size permitted by dBASE. File Fix only handles Clipper records up to 65,519 bytes (slightly below the Clipper limits of 1024 character fields with each field up to 64K characters).

NOTE: If you get the message "Contents of field invalid," data shown may be incorrect due to constraints of the field (for example, numeric data showing up in a character field). This may require changing the field type, changing prior fields, or changing the data as explained in the sections below.

Repair Damaged Headers

The dBASE file header stores the bookkeeping information about that particular dBASE file. Without the header intact, you

can't use the dBASE file. File Fix repairs a damaged header before repairing the records.

After choosing a repair method, a dialog box appears where you can review your database structure by selecting the Review Fields command button. If the field structure is damaged, which is also part of the header, File Fix requires you to review the fields by not displaying the Skip Review command button in this dialog box.

You review field structures in a dialog box that displays the field's name, type, width, and decimals (for numeric fields). If you choose to review the field structure for your database, a dialog box displays the three command buttons listed below. If File Fix found damage to the field structure, you do not see the Accept command button.

Accept: Accept the current structure of the database and continue with the rest of the repair process.

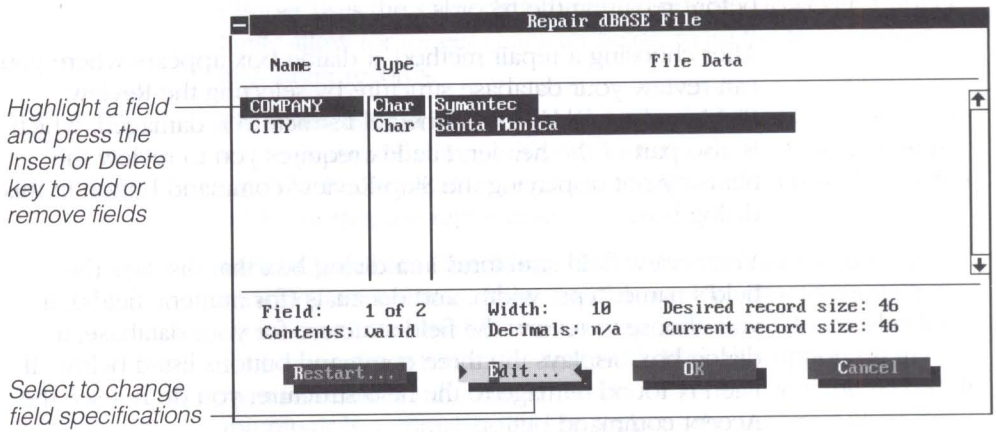
Revise: Repair the field structures by importing a header from an undamaged .DBF file. Note that you will edit, insert, and delete fields less if you import a file header with a matching field structure. You can alternatively edit your file header.

Cancel: Quit this repair operation and return to the File Fix dialog box.

If you choose to Edit the header, a dialog box shows you a scrolling text box from which you locate the start of the data. Type the exact numeric file position of the start of the data or use the mouse to drag data left and right. In a similar dialog box you next correct the record size. Select OK in these dialog boxes when the data position looks correct.

After editing the starting position and record size, you can next use the Edit command button on the subsequent dialog box to reassign field names, types, and widths as shown in Figure 17-4.

Figure 17-4 Repair dBASE File fields dialog box



Restart...: Go back to the dialog box where you can locate the start of the data.

Edit...: Display a dialog box where you can change the name, type, width, and decimal size of the highlighted field.

OK: Select to accept your changes and continue with the repair process.

CANCEL: Select to go back to the dialog box where you can choose to import a header from another file or edit this one.

TIP: Use a printout of the database, if available, as a guide when manually reconstructing the header.

Repair Damaged Records

If the dBASE file records are damaged and you are using one of the manual repair modes, File Fix displays the dialog box in Figure 17-5 for you to manually repair individual records. For each displayed record, you have the five options listed below.

Accept: Select this if you want to keep the record.

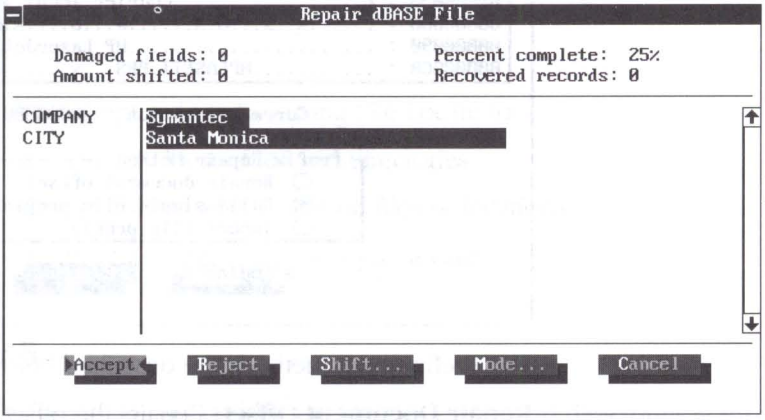
Reject: Select this if the record has no useful data.

Shift...: Move data left or right if you notice that the data in all fields is shifted over and does not appear to start at the left edge of its border. After selecting Shift..., use the arrow keys or mouse to realign the data.

Mode...: Change repair modes at any time during the repair.

Cancel: Exit the repair process.

Figure 17-5 Repair and shift dBASE file records dialog box



WordPerfect Repair Modes

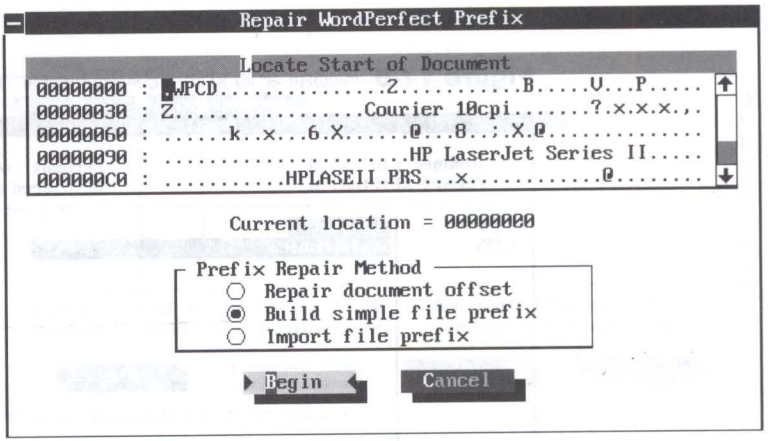
A WordPerfect document has a file prefix that contains global formatting information followed by the text and its formatting characters. The prefix includes an offset, which links the prefix to the text.

The WordPerfect repair modes are described below.

Recover Document: Checks the document for errors and performs automatic corrections. Use this repair mode first. If File Fix discovers errors in the file prefix or document offset, it displays the Repair WordPerfect Prefix dialog box shown in Figure 17-6 for you to choose a prefix repair method. If File Fix detects no prefix errors, it performs the rest of the file repair.

Review Start of Document: Displays the Repair WordPerfect Prefix dialog box to make file prefix repairs. If you used Recover Document and the file still won't open in WordPerfect or you still see extensive damage, File Fix may not have detected prefix errors. Use Review Start of Document to go directly to the dialog box in Figure 17-6 and attempt a different repair method.

Figure 17-6 Repair WordPerfect Prefix dialog box



The prefix repair methods are described below.

Repair Document Offset: Repairs the offset portion of the prefix. Use this method if you have extensive formatting information in the prefix that you want to preserve.

Build Simple File Prefix: Builds a basic file prefix for WordPerfect to open the file.

Import File Prefix: Copies the prefix from another working WordPerfect file of your choice.

Report File Output

After fixing an application's data file, File Fix generates a report of its repair activities. However, there is no report for WordPerfect fixes. Instead, File Fix inserts "**BAD**" where it discovered invalid text or if it removed formatting characters. For Excel files, File Fix prompts where to output the report before it begins file repair. File Fix gives you a choice of the following three command buttons to direct your report.

No Report: Discard report information and return to the File Fix dialog box.

Printer: Print the report.

File: Save the report of the corrective actions to a text file.

You can use the report as a guide to locate the places that you need to replace damaged data that File Fix removed.

CHAPTER

18 File Locate (FL)

This chapter describes using File Locate to:

- Quickly locate files and directories
- Limit the search to certain files or locations
- Print a listing of the files you locate

What It Does

Use File Locate (FL) to quickly locate files and directories across one or more disk drives. For each matching file or directory found, File Locate lists the file or directory name, size, time, and date of creation (or last modification), and the directory in which it is found. File Locate lists hidden and system files not listed by the DOS DIR command.

With File Locate, you can limit the search to the PATH statement or to a path specified in an environment variable. File Locate requires only a partial file specification (as little as one letter) to search for files. Unlike File Find, File Locate operates only from the DOS command line and requires very little memory to run.

When to Use It

Use File Locate to find files when you aren't certain which directory they're in. You can search for files that you know are somewhere in the DOS path, or in a path associated with an environment variable. Once File Locate finds the files, you can use the DOS redirect command to print the file listing to a printer or to a file for future reference.

You can also use File Locate to generate a list of your directories and files within a batch file. File Locate also finds hidden and system files that don't appear in the DOS DIR file listing.

How to Use It

Choose File Locate from the Norton Utilities main screen, or type FL with the following syntax at the DOS prompt to specify files or directories to search for:

FL [drive:] [filename] [/A] [/P] [/W] [/T | E:name] [/F[n]]

The File Locate command-line switches are described in the following section.

TIP: Press any key to pause File Locate during a long search. To resume the search, press any key except Esc. Pressing Esc terminates the search.

Command-Line Switches

drive: — Specify the drive to search for the file or directory you want to locate. If you don't specify a drive, the current drive is searched.

filename — Specify the name of the file or directory you want to locate. You can use the DOS wildcard characters * and ?. Don't include a path as part of the filename, because File Locate automatically searches across the entire drive you specify.

If you omit the filename, File Locate finds all files on the drive. This is equivalent to running the DIR command for each separate directory on the drive. If you don't specify an extension with the filename, File Locate searches for all files of the specified name, no matter what their extension.

/A — Search all files on all disk drives.

/P — Pause each full-screen display. Press any key except Esc to resume the display (Esc terminates the display).

/W	Display the filenames only in a "wide" format, listed in up to five columns across the screen. The size, time, and date of the files are not shown.
/T	Search for files in the PATH statement only.
/E:name	Search for files in a path specified by an environment variable. You must include the name of the environment variable when using this switch.
/F[n]	Locate only the first *n* files that match the filename, where *n* is the number of files to find. If you don't specify a number, only the first matching file is found.

NOTE: The /E:name switch has higher priority than /T; you cannot use both switches in the same command line. Even if /T is listed first in the command line, it is ignored as long as the command also contains the /E:name switch.

Examples

To locate a file named LOSTFILE.HLP, type:

```
FL lostfile.hlp
```

It searches the current drive for files and directories named LOSTFILE.HLP. To find all files named LOSTFILE, no matter what their extension, type `FL lostfile` without specifying an extension.

To locate and display only the first four files that begin with the letters AUTO, type:

```
FL auto /F4
```

To search for all .COM files on the B: drive, type:

```
FL B:*.com
```

To print a catalog of all files on the current drive, type:

```
FL > prn
```

To save a catalog of all files on the current drive to a text file, type:

```
FL > catalog.txt
```

The preceding commands use the DOS redirection character > to send the output from File Locate to a printer or file.

To find and display all .EXE files located in the directory specified by the NU environment variable, type:

```
FL *.exe /E:nu
```

CHAPTER

19 File Size (FS)

This chapter describes:

- How DOS allocates disk space to files
- Why disks invariably contain wasted space
- How to display file sizes
- How to determine if a drive has enough space for more files

What It Does

DOS sets aside a minimum amount of disk space for a file, no matter how small the contents of that file may be (unless the file is of zero length). That minimum file space is called a cluster, and its size varies depending on the kind of disk and the version of DOS you are using. If a file grows in size, DOS allocates additional space to it, but only in units of at least one cluster.

Wasted or slack space on a disk is an inevitable result of the way DOS allocates space. If you write a 2K file to a disk with a 4K cluster size, for example, 2K of space—or half the allotted space—is slack. For more information on how DOS allocates space, see Appendix A, "Disk Companion."

You can use File Size (FS) to list the size in bytes of a file or group of files. It displays the total size of a group of files, as well as the slack space in the group. File Size also determines the amount of available space that you need to copy a group of files to a target drive, taking into account the different cluster sizes of each drive.

When to Use It

Use File Size to determine whether your hard disk has enough space to install a new application. This can save you from

having to quit in the middle of an installation procedure to delete files. You can also determine whether a floppy disk has enough space for you to copy files to it.

File Size also determines the total disk space taken by certain kinds of files, such as system files, word processor files, or large graphics files.

How to Use It

To list the file sizes for the current directory, choose File Size from the Norton Utilities main screen or type `FS` at the DOS prompt. To list the size of a specific file or group of files, use the following syntax:

FS [pathname] [target drive:] [/P] [/S] [/T]

The File Size command-line switches are described in the following section.

Command-Line Switches

pathname	Specify a drive and directory name to display the sizes of all files in that directory. Specify a drive, directory, and filename to display the size of a specific file or group of files in the directory.
target drive:	Specify a drive letter to see if that drive has enough free space for the selected additional files.
/P	Pause each full-screen display. Press any key except Esc to resume the display (Esc terminates the display).
/S	Display the file sizes for each subdirectory of the specified directory.
/T	Display the total size and slack space of a drive or directory without listing its individual filenames and their sizes.

Examples

To see the sizes of all files in the current directory and its subdirectories, type:

```
FS /S
```

The total size of all files and slack space is displayed for each subdirectory.

To determine the total space taken by all the .COM files in your root directory, type:

```
FS \*.com /T
```

The /T switch suppresses the listing of each individual file, displaying only the totals.

To determine the total space taken by all the .COM files on your disk, type:

```
FS \*.com /S /T
```

The /S option includes subdirectories in the listing, so this command searches the entire disk for .COM files.

To determine whether all the .COM files on your disk will fit on the A: drive, type:

```
FS \*.com a: /S /T
```

Including a target drive letter (A: in this example) causes File Size to determine whether the specified disk has enough space to accommodate the files matched by the pathname.

To list the size of all directories on your disk, the total of all files on the disk, and the overall slack for the entire disk, type:

```
FS \ /T /S
```

This command includes a directory name (\, for the root directory) but no filename. Therefore, File Size searches for all files in the root directory and its subdirectories, and generates a list of the space usage for the entire disk.

CHAPTER

20 Image (IMAGE)

This chapter describes:

- The hard disk information that Image saves
- The files to which Image saves hard disk information
- Image command-line options

What It Does

Image (IMAGE) saves your disk's boot record, file allocation table (FAT), and root directory information to a file named IMAGE.DAT. UnFormat and UnErase both use this file to recover your data.

IMAGE.DAT resides in your root directory. It is a read-only file to prevent accidental deletion. Whenever Image runs, it creates a new IMAGE.DAT file, and renames the old one IMAGE.BAK. Image also creates a file called IMAGE.IDX which is an index file pointing to the locations of the .DAT and .BAK files. IMAGE.IDX is in the last available disk cluster because the UnFormat operation starts at the end of a disk. Speed Disk and Safe Format also update IMAGE.DAT.

You can use Image from a network drive, but it cannot protect data on a network drive.

Image is compatible with Norton Utilities version 4.5 FRECOVER.DAT files. Image updates and renames FRECOVER.DAT to IMAGE.DAT.

When to Use It

Include the Image command in AUTOEXEC.BAT to run it every time your computer starts. If you make significant changes to your disk, run Image to save this recent information to IMAGE.DAT.

How to Use It

Choose Image from the Norton Utilities main screen or type IMAGE at the DOS prompt. The syntax for Image is as follows:

IMAGE [drive:] [/NOBACKUP] [/OUT]

The Image command-line switches are described in the next section.

TIP: Use Image to save current hard disk information from the moment you start your computer. Choose STARTUP PROGRAMS... from the Norton Utilities main screen's Configuration menu and select Image to place the command in your AUTOEXEC.BAT file.

Command-Line Switches

drive:	Save information for the specified drives. If omitted, save information for the current drive only.
/NOBACKUP	Overwrite the current IMAGE.DAT file without creating the backup file, IMAGE.BAK.
/OUT	Display no update messages.

CHAPTER

21 Line Print (LP)

This chapter describes:

- How to print files from the DOS command line
- The kinds of files you can print using Line Print
- How to print to different printers
- How to print files with special formatting

What It Does

Use Line Print (LP) to print any text file directly from the DOS command line. You can print text files to a printer or file using a variety of formatting options, including line numbers, page numbers, headers, and margins.

With Line Print, you can print WordStar and EBCDIC files. You can also print files using custom printer configuration files you create with Norton Utilities Configuration, and send setup strings to your printer before printing.

When to Use It

Use Line Print to print a text file without starting its application. It is especially useful when you need to print files that require line numbers—program listings or legal references, for example.

You can put Line Print commands in batch files to repeatedly print files with the same formatting options. You can also use Line Print to print batch files and startup files.

How to Use It

To print a file using the default Line Print settings, choose Line Print from the Norton Utilities main screen or type `LP pathname` at the DOS prompt. Use the following syntax to fine-tune the appearance of your printed file or specify where to print it:

LP pathname [output] [CONFIG:name] [/Tn] [/Bn] [/Ln] [/Rn] [/HIn] [/Wn] [/TABn] [/SPn] [/HEADERn] [/PAn] [/N[+ | -]] [/A] [/80[+ | -] | /132[+ | -]] [/EBCDIC[+ | -] | /WS[+ | -]] [/PR:xx] [/SET:pathname]

The Line Print command-line switches are described in the following section.

NOTE: Use the plus sign (+) and minus sign (-) parameters to turn the following command-line switches on or off, respectively: /N, /80, /132, /EBCDIC, and /WS. If you use one of these switches without either + or -, + is assumed. These parameters are most useful for overriding printer configuration file settings (see "Printing with Configuration Files" later in this chapter).

Command-Line Switches

pathname	Specify the drive, directory name, and filename of the text file to print. Use the DOS wildcard characters ? and * to print more than one file at a time.
output	Direct the output to any printer or file by specifying the device (LPT1, for example) or filename. The default is PRN.
/CONFIG:name	Print a file using a printer configuration file you create with Norton Utilities Configuration (NUCONFIG). You must specify a configuration file description with this switch. Do not specify a path or filename; Line Print has its own configuration file search strategy. See "Printing with Configuration Files" later in this chapter for further details.

/Tn /Bn /Ln /Rn	Specify the top, bottom, left, and right margins for the printed page. The preset margins are 3 lines for the top margin, 5 lines for the bottom margin, and 5 columns for each side margin.
/HIn /Wn	Specify in number of lines the height and width of the page. The preset dimensions are 66 lines high by 85 columns wide.
/TABn	Specify the tab spacing. Tab stops are preset to 8, or every eighth column. When you reset the tab spacing, Line Print automatically expands all tab characters to the next tab stop.
/SPn	Specify the line spacing between printed lines. The preset spacing is 1 line.
/HEADERn	Specify information to print at the top of each page. To print the filename and the current date and time on one line, specify 1. To print the filename, creation (or modification) date and time, and the current date and time on two lines, specify 2. For no header, specify 0.
/PAn	Specify the starting page number. The default first page number is 1. Note that this switch does not let you specify which page of a document to start printing from, only which number to print on the first page and all succeeding pages of the document. For instance, if you used the switch /PA9 with the file STOCKS.TXT, the true first page of the document would be numbered page 9, and subsequent pages (if any) would be numbered page 10, page 11, and so on until the last page of the document.
/N	Print line numbers in the left margin.

/A	Append files to the specified output file. If the output file already exists, the additional files are added at the end of it. Otherwise, Line Print creates it. List the files to append before you list the output file. This switch works only if you specify an output file.
/80 /132	Print in standard mode with 80 columns per page, or in compressed mode with 132 columns per page. The default setting is 80 columns. These switches are mutually exclusive, so /80- is identical to /132, and vice versa.
/EBCDIC	Print a file stored in EBCDIC. Files transferred between an IBM mainframe and your PC may be stored as EBCDIC files; this switch converts them to ASCII before printing.
/WS	Print a WordStar or compatible file. ASCII uses the eighth bit for special characters, while WordStar uses the eighth bit for purposes of its own—to discriminate hard carriage returns from soft carriage returns, for example. The /WS switch tells Line Print to ignore the special characters held by the eighth bit.
/PR:xx	Print files to a particular type of printer. You must specify a two-letter printer type code with this switch. The codes and their corresponding printers are TT (teletypewriter), GE (generic), EP (Epson), PR (Proprinter), QU (Quietwriter), TO (Toshiba), LA (LaserJet), and PO (PostScript). If you don't specify a printer type, GE is assumed.
/SET:pathname	Prepare your printer before printing a file. You must specify a setup file whenever you use this switch. See "Printing with Setup Files" later in this chapter for more information.

Printing with Configuration Files

If you regularly print to different printers, or with different printing formats or setup files, you can use printer configuration files to switch printers or formats. To specify a configuration, use the /CONFIG: command-line switch followed by the configuration file description that appears in the Norton Utilities Configuration (NUCONFIG) Configure Printer dialog box. You can easily create and modify printer configuration files with Norton Utilities Configuration, as well as select a default printer configuration (which overrides the Line Print defaults for any unspecified parameters).

You can use configuration files in conjunction with the other Line Print command-line switches. However, some switches may simply duplicate settings already established in a configuration file, and there's no need to repeat them.

Use the + or - parameters with the /N, /80, /132, /EBCDIC, and /WS switches to override configuration file settings. For example, if the Laser configuration file automatically prints line numbers, you could still use this configuration file *and* suppress line numbers by typing:

```
LP words.doc /CONFIG:laser /N-
```

See Chapter 27, "Norton Utilities Configuration (NUCONFIG)," for information on creating and editing printer configuration files.

Printing with Setup Files

Some printers require special preparation before you print to them. This preparation is stored in setup files—ASCII text files that contain a series of instructions (or control codes) for the printer. Setup files may include control codes that simply ensure that your printer is online, or that actually format individual text characters. The /SET:pathname command-line switch sends all the printer control codes (collectively called the setup string) in the specified setup file to the printer before printing begins.

Create setup files using a text editor that can create ASCII files. Refer to your printer manual to determine which control codes to include in the file. Line Print only uses setup files in Lotus 1-2-3 or Norton format. Lotus 1-2-3 format is the same as the Lotus 1-2-3 setup string command, and the control codes take the following forms:

\nnn	The decimal number for the code you want to send to the printer, where *nnn* is any three-digit code. Three digits are required, so use leading zeros when necessary.
\C	A control character you want to send to the printer, where *C* is any control character.
C	A literal character you want to send to the printer, where *C* is any character.

As in Lotus 1-2-3, you can string the control codes together in one line, one after the other, as in the following:

```
\AThis is a setup string\013\010
```

This string sends a Ctrl+A (ASCII 001) to the printer followed by the message "This is a setup string," a carriage return, and a line-feed.

The Norton format is similar to the Lotus 1-2-3 format, but lets you separate control codes with carriage returns. For example, the string in the preceding example could appear as follows:

```
\AThis is a
setup string\013
\010
```

This can make setup strings easier to read.

CHAPTER

22 Norton Cache (NCACHE2)

This chapter describes the Norton Cache disk caching utility. It provides:

- A description of minimum system requirements for Norton Cache
- A description of how to modify your startup files to automatically install Norton Cache
- A brief overview of your computer's memory
- A comprehensive list of Norton Cache command-line switches
- Examples of common Norton Cache installations

What It Does

Norton Cache (NCACHE2) helps your computer work faster by using memory to hold data read from and written to disks. Since computers read and write to memory much faster than to disk, a disk cache speeds up both of these operations noticeably.

Norton Cache is a configurable read-ahead, write-back cache that is compatible with both the DOS and Windows environments. One of its advantages is its ability to multitask its writes in the background while you perform other tasks in the foreground.

When to Use It

Once installed, Norton Cache works automatically each time you use your computer. Most operations run significantly faster with the Norton Cache.

NOTE: The only time you should disable Norton Cache is when you are running a disk optimization or repair program or are low on memory. The following Norton Utilities programs automatically and temporarily disable Norton Cache: Calibrate, Norton Diagnostics, Norton Disk Doctor, and Speed Disk.

TIP: Let Norton Cache accelerate your hard disk access from the moment you start your computer. Choose Startup Programs from the Norton Utilities Configuration (NUCONFIG) menu and select Start Norton Cache to place the Norton Cache command in your AUTOEXEC.BAT file.

System Requirements and Configurations

For effective disk caching, use at least 384K of extended or expanded memory. Table 22-1 lists the defaults for cache buffer memory usage. You can use a different memory configuration if you have applications that require large amounts of extended or expanded memory.

Table 22-1 Default EMS/XMS cache size

Available memory	DOS cache size	Windows cache size*
0K to 64K	None†	None
64K to 256K	-16K‡	0K
256K to 1 MB	256K	64K
1 MB to 2 MB	512K	256K
2 MB to 3 MB	1 MB	512K
3 MB to 5 MB	2 MB	768K
5 MB to 6 MB	3 MB	1.5 MB
6 MB to 7 MB	4 MB	2 MB
7 MB to 11 MB	5 MB	3 MB
11 MB to 15 MB	6 MB	5 MB
15 MB to 23 MB	8 MB	6 MB
23 MB to 31 MB	12 MB	12 MB
31 MB to 36 MB	16 MB	16 MB
36 MB to 4000 MB	20 MB	20 MB

continued

Table 22-1 Default EMS/XMS cache size (continued)

* Numbers shown in this column are for XMS caches only. Windows cache size shrinks to 0K when the cache is in EMS because Microsoft Windows prevents any cache software from reliably using EMS.

† Norton Cache does not install in EMS/XMS if free memory is less than 64K. Instead, it installs a cache of 128K in conventional memory.

‡ Cache uses all but 16K of EMS/XMS memory available.

NOTE: If you have no extended or expanded memory, you probably should not use a disk cache. Since many applications require at least 500K to run, the remaining conventional memory would not make an effective cache.

How to Use It

To use Norton Cache, install it as a terminate-and-stay-resident (TSR) program or device driver. Once installed, it speeds your disk access and requires no adjustments.

You have two methods of installing Norton Cache. You can either select settings using the Startup Programs option in the Norton Utilities Configuration menu, or use a text editor to place the command in either your AUTOEXEC.BAT or CONFIG.SYS file. You can also install Norton Cache from the command line, but you must reinstall it after restarting your computer.

Table 22-2 compares the advantages and disadvantages of the two startup files from which you can install Norton Cache. For a detailed explanation of installation methods, see "Accelerating Disk Access with Norton Cache" in Chapter 5, "Performance Tutorials."

Table 22-2 Comparison of Norton Cache installation methods

Method	Advantages	Disadvantages
Add to AUTOEXEC.BAT	Installs as a TSR, which is removable from memory if it's the last TSR loaded	Only speeds up part of startup process
Add to CONFIG.SYS	Speeds up most of startup process	Norton Cache not removable without changing CONFIG.SYS and restarting the computer
		Can't load into high memory when using DOS=UMB
Type at command line	Good for trying different settings	Doesn't remain after restarting

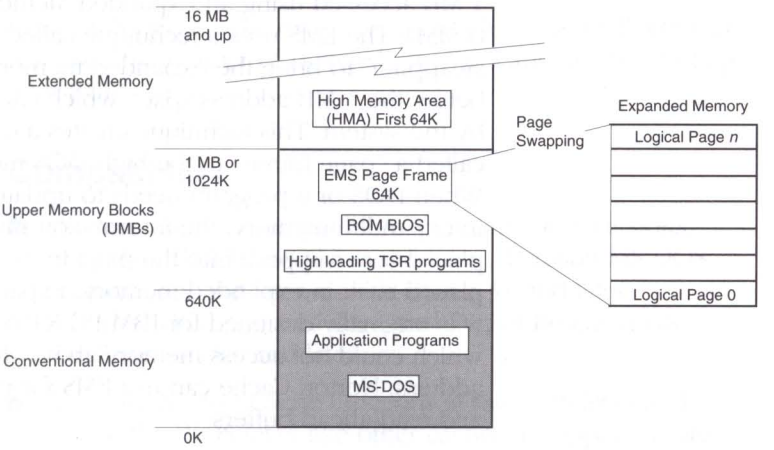
For more efficient memory use, install Norton Cache at the end of either startup file (Norton Utilities Configuration puts it there automatically).

Beyond "Conventional" Memory

Understanding memory beyond 640K will help you in using the advanced features of Norton Cache. This section provides a simple overview of the memory available on today's PCs.

Figure 22-1 provides a graphical representation of memory.

Figure 22-1 Memory diagram



The memory available on IBM PCs and compatibles is divided into the following categories:

- Conventional Memory—The first 640K of memory. Most DOS applications use only conventional memory when they run, which makes it a valuable limited resource. However, today's large Graphical User Interface (GUI) and user-friendly programs make conventional memory insufficient.
- High DOS Memory or Upper Memory Blocks (UMB)—The memory addresses between 640K and 1024K contain the BIOS information used to control system hardware. Unused memory in this area can be used to load device drivers and TSRs out of conventional memory from a UMB server such as the DOS EMM386.EXE. Loading device drivers or TSRs into high DOS memory is called "loading high." Norton Cache can put its management tables and read/write buffers in this area if space is available.

NOTE: UMBs are primarily available on 80386 systems and above.

- Expanded Memory Specification (EMS)—Memory above 1 MB accessed using an Expanded Memory Manager (EMM). The EMS uses a technique called "page swapping" to bring the expanded memory into an area below the 1 MB address space which can be accessed by the system. This technique creates a 64K region, called a "page frame," in the high DOS memory area. When DOS or a program needs to update information in expanded memory, the information must first be placed (or swapped) into the page frame, updated, then placed back in expanded memory. Expanded memory was originally designed for IBM PC XT computers, which could not access memory above the 1 MB address. Norton Cache can use EMS for its management and read-ahead buffers.
- High Memory Area (HMA)—The first 64K of extended memory, which only a few programs can use. Access requires an XMS memory manager such as the DOS HIMEM.SYS. Norton Cache can put its management tables in this area if space is available.
- Extended Memory Specification (XMS)—Memory from 1 MB to a theoretical limit of 4 gigabytes accessed using an Extended Memory Manager (XMM). The XMM allocates XMS memory to applications. Although some programs can access XMS memory directly, an XMM such as the DOS HIMEM.SYS prevents them from overlapping. Extended memory was introduced with the 80286 IBM PC AT class computers. Norton Cache can use XMS for its buffers.

By placing itself into UMBs and the HMA, Norton Cache preserves as much conventional memory as possible for other programs. Norton Cache requests memory for its buffers in the following order: XMS, EMS, then conventional memory.

Norton Cache Configuration Notes

This section offers some tips to help you configure Norton Cache.

Buffers

Your CONFIG.SYS file may have a line that says BUFFERS=*nn*. If so, set the number of buffers between 5 and 10. Try starting with BUFFERS=5.

Compatibility

- Norton Cache is compatible with recent DOS versions, including IBM PC-DOS 3.x and later, Microsoft MS-DOS versions 3.x and later, Zenith DOS 3.3+ and later, Compac DOS 3.31 and later, and Digital Research DR-DOS version 5.0 and later.
- Because Norton Cache functions at the DOS level and not at the BIOS level like other caches, it supports more storage devices, such as removable media drives and external drives. BIOS level caches do not support device-driven drives.
- If you are working with a DOS shell program like Norton Commander, you must install Norton Cache, just like any other TSR, before loading the shell program. Otherwise, you leave a hole in memory when you exit from the DOS shell, and you may not be able to unload the cache. Although not damaging, the hole takes up memory.
- Norton Cache automatically locks certain drives that support removable media locking whenever it accesses these drives. When the physical disk read-write is complete, Norton Cache automatically unlocks the drive. This action assures that you do not remove a disk accidentally before Norton Cache completes any deferred read-writes. Currently Norton Cache supports automatic drive locking for Iomega's Bernoulli Box and Syquest Removable Cartridge Drives. Refer to the Norton Utilities READ.ME file to see additional drives for which Norton Cache provides automatic drive locking support.

NOTE: To prevent continual locking and unlocking of drives during intensive read-write operations, Norton Cache waits approximately 2.5 seconds after its last deferred access before unlocking drives.

Command-Line Switches

There are three categories of Norton Cache command-line switches: install, reconfigure, and drive.

Install switches install Norton Cache. You can only change them by reinstalling Norton Cache.

Reconfigure switches modify Norton Cache after installation. However, seven switches (/DELAY, /QUICK, /MULTI, /QUIET, /STATUS, /DISKRESET, and /REPORT) can also override the default settings of Norton Cache during installation.

Drive switches modify Norton Cache during and after installation for the drives you specify.

NOTE: If you don't specify a unit of measure such as K or MB with the command-line switch parameters, Norton Cache assumes you mean kilobytes. For example, specifying /EXT=1024 is the same as specifying /EXT=1024K.

The Norton Cache command-line syntax is as follows:

path\NCACHE2 [install switches] [reconfigure switches] [[drive:] [drive switches]]

The following command shows the simplest installation:

```
NCACHE2 /install
```

This command-line specification assumes the NCACHE2.EXE program is in the current directory or in the PATH statement. It installs the cache using the default switches.

Examples at the end of this chapter show more detailed installations. For most systems, your main concern is specifying the best memory size for the cache to use; the Norton Cache defaults cover the rest.

NOTE: A Norton Cache installation requires at least one of the following switches: /DOS, /EXP, /EXT, or /INSTALL. Without one of these switches, Norton Cache displays the message "Norton Cache is NOT Installed."

The following three sections list and describe each command-line switch alphabetically. Default settings are also listed.

Install Switches

Use any of these switches when installing Norton Cache.

/BLOCK=n

Specifies the size of the cache blocks. A block is a group of contiguous sectors on a disk that Norton Cache has either read from or written to.

Memory efficiency is affected by block size.

- Larger cache blocks require less memory to manage than smaller blocks and provide faster access to cached data.
- Smaller blocks usually provide more efficient memory use. In other words, with a little speed sacrifice, smaller blocks use less memory because they contain fewer unused gaps. However, the cache needs more of these smaller blocks, which means management tables grow larger and create a higher memory overhead.

Ultimately, smaller blocks make the cache more efficient. When you only use conventional DOS memory for the cache, selecting a smaller block may improve performance because it's a small cache.

Default: Cache blocks can be 512 bytes, 1024 bytes, 2048 bytes, 4096 bytes, or 8192 bytes based on the cache size. Norton Cache sets the block size automatically to minimize cache management overhead and maximize cache speed. The default unit for block size is in bytes.

The block size Norton Cache sets also depends on the /OPTIMIZE setting:

/OPTIMIZE=speed	/BLOCK=8192
/OPTIMIZE=efficiency	/BLOCK=*s*, where *s* is the smallest cache BLOCK possible based on the size of a single disk sector (usually 512 or 1024 bytes) and the cache size. To determine the sector size (bytes per sector) on your disk, use Norton Utilities System Information (SYSINFO) to view disk characteristics.
/OPTIMIZE=memory	/BLOCK=8192

See the description of the /OPTIMIZE switch for more information.

/DOS[=[-]n]

Specifies the conventional DOS memory to use for the cache, which can be 24K to all but 128K. If you use the optional minus sign, this amount represents the conventional DOS memory to reserve for other applications, which must be at least 128K; Norton Cache uses the remaining memory.

Default: Approximately 128K of conventional DOS memory for the cache.

WARNING: Using conventional DOS memory for disk caching is not recommended. Also, you cannot use the /DOS switch in combination with the switches /EXP and /EXT.

/EXP[=[-]n]

Specifies the amount of expanded memory to use for the cache, where *n* is the cache size.

If you use the minus sign, this amount represents the expanded memory reserved for other applications. Norton Cache uses the remaining expanded memory.

Default: See Table 22-1.

NOTE: If you use expanded memory, Norton Cache requires an Expanded Memory Manager (EMM) to be Lotus-Intel-Microsoft (LIM) EMS 4.0-compatible.

/EXT[=[-]n[,m]]

Specifies the amount of extended memory to use for the cache, where *n* is the cache size. If you only specify one parameter after this switch, Norton Cache creates a cache of that size under DOS, which shrinks to 25 percent when running Windows. If your cache is 256K or less, it does not run with Windows and resumes operation after returning to DOS.

Use the *m* parameter to specify the smallest amount of extended memory to retain for the cache when running Windows 3.x in enhanced mode.

If you use the minus sign, this amount represents the extended memory reserved for other applications. Norton Cache uses the remaining extended memory for buffers.

Default: See Table 22-1. The default value for *m* is equal to one-quarter of *n*.

/INI=[drive][path]

Specifies where to locate the Norton Cache initialization file. You can also rename the initialization file with this switch.

The initialization file defines the switch settings for Norton Cache. Norton Cache creates this file when you save your settings either with /SAVE or through Norton Utilities Configuration.

Default: Creates NCACHE.INI in the directory where the Norton Cache resides.

/INSTALL

Installs and configures Norton Cache according to the defaults in the NCACHE.INI file. You can override these defaults by specifying other switches when you install. Norton Cache remains resident until you uninstall the cache or turn off your computer.

Defaults: This switch sets the following parameters:

/BLOCK=8K
/DELAY=1.0 second
/DOS=0
/EXT or /EXP= see Table 22-1
/INI=NCACHE.INI in Norton Utilities directory
/MULTI=off
/OPTIMIZE=speed
/QUICK=on
/QUIET=off
/READ=8K
/REPORT=off
/USEHIGH=on
/USEHMA=on
/WRITE=largest track size or 16K, whichever is less

/OPTIMIZE=speed | efficiency | memory

Determines four other cache switches to achieve different balances of performance and memory use. Each of these switches is described below. /OPTIMIZE sets several switches, allowing you to quickly set up the cache.

NOTE: You can override any of the switches affected by /OPTIMIZE.

Default: /OPTIMIZE=speed.

Speed: Configure Norton Cache to a fast setting for most computers.

/READ=8K
/WRITE=largest track size or 16K, whichever is less
/DELAY=1.0
/BLOCK=8K

Efficiency: Configure Norton Cache to use cache buffers more efficiently.

/READ=8K
/WRITE=8K
/DELAY=1.0
/BLOCK=s, where *s* is the smallest cache BLOCK possible based on the size of a single disk sector (usually 512 or 1024 bytes) and the size of the cache

Memory: Configure Norton Cache to use as little memory as possible while still providing the speed from some caching functions.

/READ=0K (disables read-ahead)
/WRITE=0K (disable IntelliWrites, the switch that allows Norton Cache to multitask its writes in the background)
/DELAY=0.0K (no deferred writes)
/BLOCK=8K

/READ=n

Specifies the size of the read-ahead buffer. Norton Cache reads *n* kilobytes ahead, where *n* equals 0 or is 8K to 63K. When *n* equals 0, Norton Cache disables the read-ahead ability. Note that setting *n* to more than 8K rarely improves performance.

Default: 8K.

/USEHIGH=on | off

Specifies whether to use high DOS memory, or UMBs, between 640K and 1024K. This switch minimizes conventional memory use. High memory is available on 80386 or higher computers using an 80386 Extended Memory Manager such as EMM386.EXE. Norton Cache makes the best use of this memory when installed at the end of AUTOEXEC.BAT.

Default: On.

NOTE: By default, Norton Cache automatically loads itself into high memory. Do not use an explicit LOADHIGH command to load Norton Cache high. When setting DOS=UMB you must load Norton Cache from AUTOEXEC.BAT to load it high.

/USEHMA=on | off

Specifies whether to use the XMS High Memory Area (HMA), which is the first 64K of extended memory. This switch minimizes conventional DOS memory use. The HMA is available only when an Extended Memory Manager is present, such as HIMEM.SYS or EMM386.EXE.

Default: On.

/WRITE=n

Specifies the size of the IntelliWrite write-back buffer. Norton Cache writes *n*K of data in one disk operation in the background, where *n* equals 0 or is 8K to 63K. When *n* equals 0, Norton Cache disables /WRITE. Note that setting *n* to more than 8K rarely improves performance. If you set IntelliWrites=off, also set /WRITE=0; otherwise, the cache ties up this memory, which is not used.

Default: 8K.

Reconfigure Switches

While some reconfiguration switches only modify Norton Cache once it's installed, you can use most of them to also affect the cache during installation: /DELAY, /QUICK, /MULTI, /QUIET, /STATUS, /DISKRESET, and /REPORT.

/DELAY=ss.hh

Defers disk writes for up to 59 and 99/100 seconds for each cached drive with IntelliWrites enabled. The format for this switch is *ss.hh* where *ss* is the number of seconds from 0 to 59, and *hh* is the number of hundredths of a second between 0 and 99 to delay the write.

Defaults: Depends on the /OPTIMIZE setting:

/OPTIMIZE=speed	/DELAY=1.0
/OPTIMIZE=efficiency	/DELAY=1.0
/OPTIMIZE=memory	/DELAY=0.0

A delay greater than 0.0 seconds often makes routine database operations such as indexing and sorting run faster.

WARNING: When writing to removable media or floppy disks, the /DELAY is greater than 0, and the IntelliWrites is enabled for the drive, remember to wait for the disk writes to finish before removing the disk even when you are returned to the DOS prompt. Ordinarily, your drive light goes out when your disk writes are done; however, if you perform some other computing activity, the disk writes wait in the background until your computer is free again to finish the writes. To see if the writes are done, wait until after the length of the /DELAY setting without performing any computing activity.

/DISKRESET = on | off

Specifies that Norton Cache write all cached data to disk after an application makes a disk reset request. The requesting program suspends until Norton Cache finishes writing. With this switch off, Norton Cache ignores disk reset calls.

Most programs never or rarely request disk resets and are unaffected by this switch. Some programs make many such requests, which reduce the cache performance by preventing Norton Cache from writing to disk in the background. If you frequently run such programs, disable this switch.

Default: On.

/DUMP

Writes to disk any data in memory not yet written to disk.

Default: None.

/HELP or /?

Displays a list of all command-line switches with a brief description of each.

Default: None.

/MULTI[=on | off]

Enables the multitasking write ability of Norton Cache. With /MULTI on, Norton Cache writes in the background while DOS executes applications in the foreground. When it's off, Norton Cache suspends the foreground application while writing data in the background.

Default: Off.

NOTE: Because this switch may not be compatible with some computer and BIOS configurations, it is initially off.

/QUIET

Prevents Norton Cache from displaying any messages on the screen unless there is an error.

Default: None.

/QUICK=on | off

Controls how quickly Norton Cache returns to the DOS prompt (after exiting an application or at the DOS prompt) during write operations. When it's on, Norton Cache returns the prompt before completing any pending writes and finishes them in the background. When it's off, Norton Cache writes data in the cache to disk before returning to the DOS prompt.

Default: On.

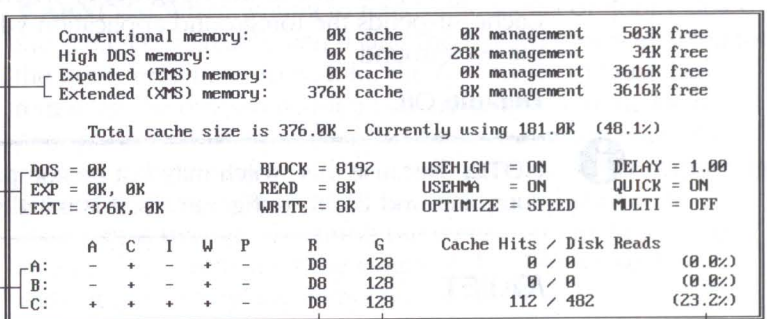
NOTE: When copying files to floppy disks with /QUICK=on and IntelliWrites enabled for the target drive, remember to wait for the disk writes to finish before removing the floppy disk.

/REPORT[=on | off]

Displays a listing of the current cache allocation, performance of each cached drive, drive status, configuration, and statistics. Specify /REPORT=on to get the report during system startup and when typing most Norton Cache commands at the DOS prompt. Figure 22-2 shows a sample report.

Default: Off.

Figure 22-2 Norton Cache report screen


Conventional memory: 0K cache 0K management 503K free
High DOS memory: 0K cache 28K management 34K free
Expanded (EMS) memory: 0K cache 0K management 3616K free
Extended (XMS) memory: 376K cache 8K management 3616K free
Total cache size is 376.0K - Currently using 181.0K (48.1%)
DOS = 0K
EXP = 0K, 0K
EXT = 376K, 0K
BLOCK = 8192
READ = 8K
WRITE = 8K
USEHIGH = ON
USEHMA = ON
OPTIMIZE = SPEED
DELAY = 1.00
QUICK = ON
MULTI = OFF
A C I W P R G Cache Hits / Disk Reads
A: - + - + - D8 128 0 / 0 (0.0%)
B: - + - + - D8 128 0 / 0 (0.0%)
C: + + + + - D8 128 112 / 482 (23.2%)

Memory allocation

Install and reconfigure switch status

Drive switch status

Read buffer status

Cache performance averages

Memory allocation: Reports the amounts in each memory location for the Norton Cache management files and buffers.

Install/reconfigure switches: Reports the settings for each switch.

NOTE: If you use a program to dynamically swap drive letters after installing Norton Cache, the drives in the report may not match the switches. Norton Cache does cache the correct drive, however.

Drive switches: Indicates the status of each drive switch with a + (enabled) or a - (disabled).

A	activates caching
C	inhibits additional caching
I	activates IntelliWrites
W	activates write-through
P	activates write-protection

Read buffer status: R indicates the kilobytes of data to read ahead for the drive. G indicates the sector-group read-size selected for that drive.

Cache performance: Compares the number of sectors read from the cache to those read from the disk. You see this performance ratio in the percent field. Higher percentages indicate more effective cache settings. Since the CPU must initially read data from the disk, then write back data that is usually different, it is nearly impossible to achieve a 100-percent hit ratio.

/RESET

Resets the cache by writing all deferred disk writes, flushing all drives of old data, and reinitializing the cache management table.

Default: None.

NOTE: All deferred disk writes are written to disk before the cache reset.

/SAVE

Saves to a file the current Norton Cache configuration settings. Once you save the cache configuration, you can uninstall and reinstall Norton Cache at any time with the same switches set automatically from the configuration file.

If you did not specify the name of the configuration file with the /INI switch, Norton Cache stores your settings in the Norton Utilities directory in the default file NCACHE.INI.

Default: None.

/STATUS[=on | off]

Displays a condensed version of the Norton Cache report at startup and whenever you reconfigure a switch. If you specify /REPORT=on, the report screen preempts the status screen and vice versa.

Default: On.

/UNINSTALL

Removes the Norton Cache TSR and frees the memory it was using. You can uninstall Norton Cache only if it was loaded from your AUTOEXEC.BAT file or the command line, and not from your CONFIG.SYS file. Also, if Norton Cache was not the last TSR loaded, you must either remove TSRs loaded after it or restart the system without installing Norton Cache.

Default: None.

Drive Switches

Use the drive switches to control and fine tune the operation and performance of each cached drive. To affect a cached drive independently of other cached drives, precede the switch with a drive specifier. For example, /-A D:/+A deactivates caching for all drives except D:. Except for the /F switch, you can use drive switches during or after installation.

/- | + A

Activates and deactivates caching for the specified drives. You can temporarily disable caching for a drive without uninstalling Norton Cache with /-A. You can reactivate a drive using the /+A switch.

Default: Cache all drives except A: and B:.

/- | + C

Specifies whether Norton Cache caches additional data while allowing access to currently cached data. Use this switch to lock in frequently needed data.

Default: /+C.

/F

Flushes (clears) the cache of all data for the specified drives. Norton Cache writes all deferred disk writes to disk before flushing the cache.

Default: None.

/G=n

Cache only those disk reads or writes that are less than or equal to *n*, where *n* is the number of sectors.

For efficiency, DOS makes disk read and write requests in groups of sectors. DOS can request a maximum of 128 sectors in one operation, which equals 64K for a 512 byte standard sector. Files larger than 64K require multiple requests.

DOS loads large programs in multiple 64K requests. Many programs, particularly database programs, access most files in smaller increments (records). Also, data files can get fragmented and require multiple seek operations for a single record. Large program files tend to be contiguous on the disk, so loading them is faster and needs less head movement.

If you spend much time accessing record-type data files or small files and do not want to fill your cache with the larger programs, specify a value for *n* of less than 128; for example, 16.

Another way to control cache use is to put your programs on one disk and your data files on another. Install Norton Cache with /G=8 for the program disk and the default (/G=128) for the data disk. Your cache is now more likely to cache only your data files, along with the directory and file allocation tables for both disks.

Default: /G=128.

/- | + I

Specifies whether to use IntelliWrites for the specified drives. Enabling IntelliWrites allows the cache to wait for several write requests to accumulate, and make them all at once to improve performance.

Also, IntelliWrites multitasks disk writing in the background and program execution in the foreground (with /MULTI on), which improves performance.

Default: Enabled for all drives except A: and B:.

NOTE: IntelliWrites are automatically disabled whenever /WRITE=0, which occurs when /OPTIMIZE=memory.

/- | + P

Specifies whether to write-protect the specified drives. This switch has the same effect as putting a write-protect tab on a floppy disk.

Default: /-P (no write protection).

NOTE: This write protection prevents both DOS-level and BIOS-level disk writes. Programs that directly access the hardware can still write to the disk.

/R[=[D][n]]

Sets the number of sectors to read ahead to *n* kilobytes. Specifying the D parameter limits disk reads to dynamic reading, which enables read-ahead only for sequential disk reads and not for random reads. The maximum value for *n* cannot exceed the read-ahead buffer size set by /READ.

To improve performance when reading very fragmented files, set *n* for a smaller value (1K increments). Conversely, if the files to read are only slightly fragmented, set *n* for a large value. When *n* equals 0, Norton Cache disables read-ahead for the specified drives.

Default: /R=D*max*, where *max* is the size of the read-ahead buffer, which is 8K unless set otherwise with /READ.

NOTE: This switch may not improve DOS operations such as loading programs and copying files.

/- | + W

Specifies whether to use write-through for the specified drives. Write-through caching takes sectors that are being written to disk and allows Norton Cache to copy them into its buffers.

Specify write-through for applications, such as a disk sort utility or a database sort, that repetitively reads and writes the same data. A disadvantage is that write-through fills the available cache space faster than a read-only cache.

When disabled, Norton Cache caches only read data.

Default: /+W (enable write-through).

NOTE: This switch has no effect when IntelliWrites are enabled (/+I). However, any sectors already in the cache are always updated when written again, regardless of the state of /I or /W.

Norton Cache Installation Examples

This section provides examples of Norton Cache AUTOEXEC.BAT file installations and CONFIG.SYS file installations. Note that you can also use any AUTOEXEC.BAT installation as a command-line installation.

Sample AUTOEXEC.BAT Installations

The following installations assume that NCACHE2.EXE is in the current directory or PATH statement.

To install Norton Cache and use all but 32K of extended memory, use a read-ahead buffer of 16K, cache all drives including A: and B:, and disable IntelliWrites for all drives and write-through caching for drive C:, add this line to your AUTOEXEC.BAT file:

```
NCACHE2 /EXT=-32 /READ=16K C:/-W /-I A:/+A
  B:/+A
```

NOTE: All cached drives default to a new read-ahead of /R=D16 because of the /READ setting.

To install Norton Cache using all but 192K of extended memory and use the default switches for each drive, add:

```
NCACHE2 /EXT=-192K
```

To install Norton Cache using all available expanded memory for the cache and make drive C: the only cached drive, add:

```
NCACHE2 /EXP /-A C:/+A
```

To install Norton Cache and:

- allocate all but 1 MB of extended memory to DOS
- allocate at least 2 MB of extended memory when running under Windows 3.x
- optimize for memory usage
- permit IntelliWrites to use an 8K write-back buffer
- limit to 16 the sectors DOS can read and cache on drive D:

add:

```
NCACHE2 /EXT=-1M,2M /OPTIMIZE=MEMORY
  /WRITE=8K D:/G=16
```

NOTE: All cached drives default to read-ahead disabled because OPTIMIZE=memory.

Sample CONFIG.SYS Installations

To leave all switches to their default values or use a configuration you've previously saved, add this line to your CONFIG.SYS file:

```
DEVICE=NCACHE2.EXE /INSTALL
```

This installation assumes that NCACHE2.EXE is in the root directory of the boot disk.

To install Norton Cache with NCACHE2.EXE in the NU directory on C:, use 384K of extended memory for the cache, cache all drives including A: and B:, and enable IntelliWrites for all drives including A: and B:, add:

```
DEVICE=C:\NU\NCACHE2.EXE /EXT=384K /+A /+I
```

To install Norton Cache with NCACHE2.EXE in the NU directory on C:, use 2 MB of extended memory, disable write-through caching, and disable IntelliWrites except for drive C:, add:

```
DEVICE=C:\NU\NCACHE2.EXE /EXT=2M /-W /-I C:/+I
```

To install Norton Cache with NCACHE2.EXE in the NU directory on C:, use 4 MB of extended memory for the cache when running outside of Windows 3.x, use at least 1 MB of extended memory when under Windows 3.x, cache drives C: and D: only, and write-protect drive A:, add:

```
DEVICE=C:\NU\NCACHE2.EXE /EXT=4M,1M /-A C:/+A
  D:/+A A:/+P
```

To install Norton Cache with NCACHE2.EXE on C: in the NU directory, use all but 1024K of expanded memory for the cache, cache all drives but D: (and A: and B: by default), and disable IntelliWrites for drive C:, add:

```
DEVICE=C:\NU\NCACHE2.EXE/EXP=-1024 C:/-I D:/-A
```

CHAPTER

23 Norton Change Directory (NCD)

This chapter describes using Norton Change Directory to:

- Navigate in your directory tree
- Make or remove directories
- Rename directories
- Relocate entire branches of your directory tree
- Get information about your disk and directory structure

What It Does

Norton Change Directory (NCD) graphically displays the directory structure of your disk so you can easily navigate from directory to directory, and perform directory management chores. You also can print your directory tree structure or find out the size of any directory and all of its subdirectories.

The first time you run Norton Change Directory, it creates a file called TREEINFO.NCD to maintain directory information for the drive. The file is placed in the root directory and cannot be moved. Whenever you run Norton Change Directory again, it uses the information stored in this file. All Norton Change Directory commands automatically update the TREEINFO.NCD file.

NOTE: On a network drive, Norton Change Directory stores the TREEINFO.NCD file in a directory called NCDTREE, located in the root directory for each network drive. The network administrator should create this directory and grant all users full rights to it.

When to Use It

Use Norton Change Directory to change the current directory, make a new directory, rename a directory, move a directory to a new location, and delete a directory and all of its subdirectories. You can also use it to print a copy of the directory tree.

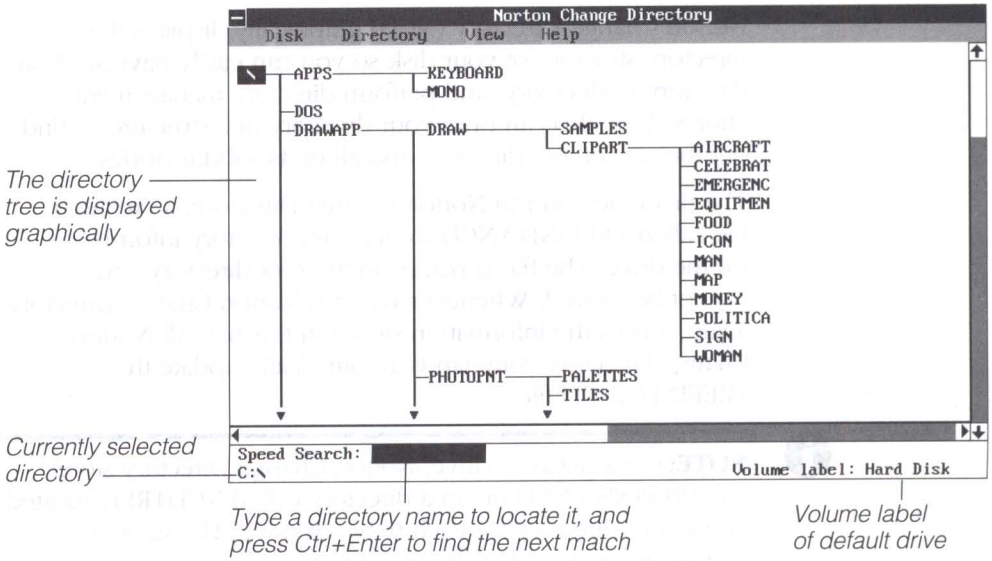
With Norton Change Directory, you can add, delete, or modify a volume label, and find out the size of a directory and all of its subdirectories.

How to Use It

This section describes basic usage of Norton Change Directory. See "Norton Change Directory Menu Commands" later in this chapter for a summary of all options.

Choose Norton Change Directory from the Norton Utilities main screen, or type NCD at the DOS prompt. Your directory tree is displayed as illustrated in Figure 23-1.

Figure 23-1 Norton Change Directory screen



To change the current directory:

Use the cursor keys to highlight any directory. Then press Enter to quit Norton Change Directory and change to the specified directory. With a mouse, double-click a directory to exit Norton Change Directory and change to that directory. Or, use Speed Search to quickly locate any directory—just start typing the directory name. If a match is found but it's not the one you want, press Ctrl+Enter to find the next match.

To perform directory management operations:

Use the arrow keys to highlight the directory or click it with the mouse. Then choose the desired operation from the Norton Change Directory pull-down menus. For example, you might choose the RENAME... command from the Directory menu to rename a directory—a capability DOS forgot to include.

To update the TREEINFO.NCD file:

If you use the DOS MD and RD commands rather than the MAKE... and DELETE... commands on the Norton Change Directory Directory menu, the TREEINFO.NCD file is not updated. Choose RESCAN DISK... from the Disk menu to make sure the TREEINFO.NCD file does not contain out-of-date information.

TIP: If you're using Norton Change Directory to change directories on a write-protected disk, type `NCD /N` for "nowrite." This turns off Norton Change Directory's automatic update of the TREEINFO.NCD file to prevent a "write-protect" error message.

To delete a directory:

Highlight the directory, then choose DELETE... from the Directory menu. If the directory contains any files, Norton Change Directory lists them to make sure you really want to delete the directory. You cannot delete a directory that contains other subdirectories with this command; use REMOVE TREE... instead.

NOTE: Norton Change Directory has three powerful but potentially dangerous commands: COPY TREE..., REMOVE TREE..., and PRUNE & GRAFT.... For safety, these commands are disabled when you first start the program. To use them, choose the CONFIGURE command from the Directory menu and check the ones you want to use.

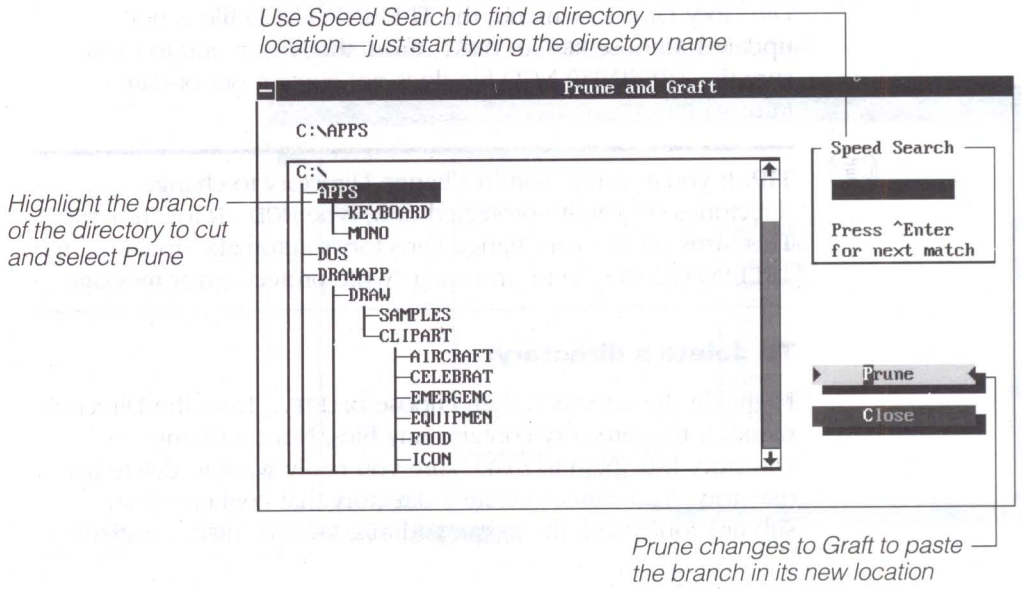
To delete a branch of the directory tree:

Highlight the directory at the branch you want to delete, then select REMOVE TREE... from the Directory menu. A dialog box appears to confirm your intention. Answer Yes to delete the highlighted directory and all of its subdirectories.

To move a branch of the directory tree:

Choose PRUNE & GRAFT... in the Directory menu. The Prune and Graft dialog box appears, as illustrated in Figure 23-2.

Figure 23-2 Prune and Graft



Highlight a directory and select Prune. The Prune command button changes to Graft. Use the cursor keys or the mouse to move the directory. All subdirectories of the selected directory are moved with it. Select Graft to place the branch in the new location. Press Esc at any time before you select Graft if you change your mind about moving the directory.

TIP: You cannot prune and graft directories across drives. To move branches of the directory tree across drives, choose COPY TREE... in the Directory menu and check the Delete Original Files check box.

Command-Line Switches

Norton Change Directory has a powerful set of command-line switches to speed directory operations and bypass the menus. This section explains the most frequently used switches. See Appendix C, "Command Line Reference," for a complete summary and usage information.

To change to another directory:

Type `NCD dirname`, where "dirname" is the name of the desired directory. With Norton Change Directory, you only need to specify the first few characters of the end-point directory, not the whole pathname. Don't precede the directory name with a backslash (\), because this always means the root directory. For example, to change to the \BRIEF\BACKUP directory, enter `NCD BAC` from any directory on your disk.

To update the TREEINFO.NCD file:

If you use the DOS MD (make directory) or RD (remove directory) commands, the TREEINFO.NCD file may become out of date. Type `NCD /R` to rescan the disk and update the TREEINFO.NCD file.

To make a new directory:

Type `NCD MD dirname`, where "dirname" is the name of the new directory. Like the DOS MD command, the new directory is created immediately below the current directory unless the complete path is specified.

Norton Change Directory Menu Commands

This section describes the Norton Change Directory commands available from the pull-down menus.

The Disk Menu

CHANGE DISK...: Change the default drive.

RESCAN DISK...: Update the directory tree. The TREEINFO.NCD file is not created on disks that have three or fewer directories; it is faster to rescan the disk than to rebuild the file.

VOLUME LABEL...: View, add, change, or delete the volume label. Unlike DOS, you can use both uppercase and lowercase letters.

FREE SPACE...: Display disk use statistics.

PRINT TREE...: Output the directory structure to the printer or a file. PRN is the default printer, but you can also enter a port such as LPT1 or LPT2. Or, enter a filename. You can specify a graphic tree with line-drawing characters, a character tree without the line-drawing characters (not as pretty, but it prints on any printer), or a text list of directories.

EXIT: Quit Norton Change Directory.

The Directory Menu

FILE LIST...: List files in the selected directory. The listing can be sorted by any combination of name, extension, date, time, and size. Check the sort criteria in the desired order. The sort key is displayed in the Sort Order box.

RENAME...: Rename the selected directory.

MAKE...: Make a new directory as a subdirectory of the currently selected directory.

DELETE...: Remove the currently selected directory. You cannot remove the directory if it contains other subdirectories (use REMOVE TREE... instead).

TREE SIZE: Display the total size of all files in the selected directory and all its subdirectories, as well as the total allocated disk space for the files.

COPY TREE...: Copy the selected directory and all its subdirectories to a new location on the tree, with the option to delete the original files after copying. The new location can also be on another drive. For safety, this feature is disabled by default. Enable it with the CONFIGURE command in the Directory menu.

REMOVE TREE...: Delete the selected directory and all its subdirectories. For safety, this feature is disabled by default. Enable it with the CONFIGURE command in the Directory menu.

WARNING: Be very careful with the REMOVE TREE... command. It's no easy chore to recover all the files and subdirectories that were removed.

PRUNE & GRAFT...: Cut (prune) a branch of the directory tree and move (graft) it to a new location on the same drive. To move branches across drives, use the COPY TREE... command. For safety, this feature is disabled by default. Enable it with the CONFIGURE command in the Directory menu.

CONFIGURE: For safety, the most potentially dangerous commands are disabled by default. Use CONFIGURE to enable COPY TREE..., REMOVE TREE..., and PRUNE & GRAFT.... When disabled, the commands cannot be used either in full-screen mode or from the command line.

The View Menu

Set the number of screen display lines. MDA and CGA displays use 25 lines, EGA and VGA displays can use 25, 28, 43, or 50 lines. When you exit Norton Change Directory, the display is restored to its original setting.

CHAPTER

24 Norton Control Center (NCC)

This chapter describes using Norton Control Center to:

- Change the cursor size
- Select video mode and display colors
- Adjust keyboard and mouse speed
- Set the system date and time
- Configure serial ports
- Choose country-specific display formats
- Run stopwatches
- Save and load hardware settings from a file

What It Does

Use Norton Control Center (NCC) to view and change many of your computer's hardware settings quickly and easily. You can specify DOS colors and video modes, adjust keyboard speed and mouse sensitivity, configure serial ports, and specify country display formats. In addition, you can run up to four stopwatches simultaneously.

When to Use It

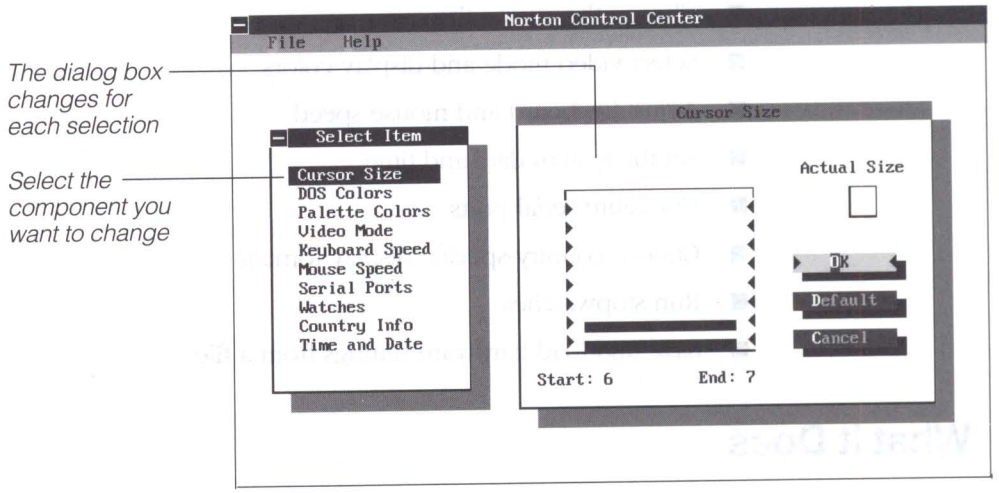
Use Norton Control Center to set up your daily work environment. After creating a settings file that contains your hardware preferences, run it from your AUTOEXEC.BAT file so that the settings take effect every time you start your computer.

Use the stopwatches to time meetings or track hours on specific projects. You can create batch files that automatically maintain a project-specific work log.

How to Use It

Choose Control Center from the Norton Utilities main screen, or type NCC at the DOS prompt. The Norton Control Center screen appears as illustrated in Figure 24-1.

Figure 24-1 The Norton Control Center screen



From this screen, select an option in the Select Item dialog box, then press Enter to activate the corresponding settings dialog box and make your changes. Any settings you change remain in force until you restart your computer.

NOTE: The "lifetime" of Norton Control Center settings can be limited by other programs. For example, some programs reset palettes, change modes, adjust the cursor, and so on. Should this occur, you'll have to reload your settings.

To reuse the same settings, save them to a settings file and reload the settings file from the command line.

To save the settings in a file:

Choose SAVE SETTINGS from the File menu. In the Save Settings dialog box, check the settings you want to save, then enter a filename for the settings file (a file extension is not required). Select OK to create the file and exit the Save Settings dialog box.

To modify a settings file:

Choose LOAD SETTINGS from the File menu. Enter the settings file filename in the Load Settings dialog box. Don't forget to specify the complete pathname if the file is not in the current directory.

To load a settings file from the command line:

Type `NCC pathname /SET` at the DOS prompt, where "pathname" is the name of the settings file. The system is set up according to the settings in the file. If you omit the /SET switch, the Norton Control Center screen appears with the settings file loaded for modification. You must include the complete pathname for the settings file if it is not in the current directory. See Appendix C, "Command Line Reference," for more options when loading settings from a file.

TIP: To reset all of your hardware options automatically when you start your computer, put an NCC command line in your AUTOEXEC.BAT file. For example, if your settings file is called MYHOUSE.DAT and it resides in your Norton Utilities directory, place the line `NCC c:\nu\myhouse.dat /SET` in your AUTOEXEC.BAT file.

Norton Control Center Options

The following sections detail the Norton Control Center options.

Cursor Size

With Cursor Size, you can change the shape of your cursor. On some laptop computers, for example, a block cursor may be easier to see than an underscore. The cursor is created with scan lines, numbered from 0 at the top of the character block with the total number of scan lines varying with the display adapter. A color graphics adapter can display up to 8 scan lines (0 to 7)

for the cursor, and a monochrome display adapter can display up to 14 scan lines (0 to 13).

If you are using NDOS, Cursor Size has no effect. NDOS sets the cursor size itself.

DOS Colors

With DOS Colors, you can change screen colors to any combination of foreground and background colors, as well as an optional border color.

NOTE: On some displays, the DOS Colors will not "stick" unless the ANSI.SYS driver is loaded from your CONFIG.SYS file.

Many applications set their own screen colors and a few do not reset them when you exit the application. You can create a batch file similar to the following example to reset screen colors.

```
program                          (application name)
NCC pathname /DOSCOLOR           (Norton Control Center
                                 settings file)
```

The batch file loads the program, then resets only DOS Colors to those specified in the Norton Control Center settings file upon exit. Don't forget to specify the drive and directory of the settings file. For more information on using Norton Control Center options, see Appendix C, "Command Line Reference."

Palette Colors

If your computer has an EGA or VGA display, you have more color choices available. Although your display adapter may be capable of displaying 256 colors, you select from a color palette containing only 64 colors. Of these, you can use up to 16 colors at one time. The Palette Color dialog box lists the names of the standard 16 colors alongside a display of your replacements.

Video Mode

If you have an EGA or VGA display, you can increase the number of lines displayed on the screen or set the display either to color or black and white. You can also use command-line switches to set these options. See Appendix C, "Command Line Reference," for more information.

Keyboard Speed

With Keyboard Speed you can set how many characters repeat per second when you hold down a key and the delay before a character repeats. This does not affect your typing speed; however, you can edit faster with a fast keyboard since you can move the cursor around the screen more quickly. This option works on PC AT-compatible or "enhanced" keyboards.

TIP: To set the fastest repeat rate and the shortest delay without using a settings file, place the command NCC /FAST in your AUTOEXEC.BAT file. For more information on using Norton Control Center options, see Appendix C, "Command Line Reference."

Mouse Speed

If you have a fully Microsoft-compatible mouse, use Mouse Speed to adjust mouse sensitivity. The range for mouse speed is from 0 (dead) to 100 (frisky), with a default setting of 50. The mouse sensitivity actually changes as you adjust values in the dialog box so you can test the changes. If you set the mouse speed to zero, the mouse no longer moves. Use the keyboard arrow keys to reset the speed.

Serial Ports

Use Serial Ports to configure your serial ports without using the DOS MODE command. The configuration for each available port appears at the top of the Serial Ports dialog box. You can set the following parameters:

Baud	Speed at which communications are to take place. 9600 or 19200 are common settings for communications with peripheral devices (such as serial printers) connected directly to your computer.
Stop Bits	A signal sent at the end of each pulse of information that indicates that the particular pulse is finished. The most common choice is "1" for stop bits.

Parity	Type of error-checking protocol. "None" is the most common choice.
Data Bits	Number of bits to send with each pulse of information. Use "8" if parity is "none"; use "7" otherwise.

Watches

You can run up to four stopwatches simultaneously. Once started, they keep on ticking even if you exit Norton Control Center. The stopwatches, however, are generally used from the command line or in batch files. See "Using the Stopwatches" later in this chapter and Appendix C, "Command Line Reference," for more information.

Country Info

Use Country Info to set the display format for time, date, currency, lists, and numbers for your country. The country's code number, listed beside the country choices, is generally the same as the country's international telephone dialing prefix.

To use this option, you must first load the country device driver (for example, COUNTRY.SYS) from your CONFIG.SYS file. The syntax is COUNTRY=*nnn*, where "nnn" is the country code (001 for the U.S.). For DOS 3.3 or later, you must also run the DOS NLSFUNC (National Language Support Function) command (for example, `nlsfunc c:\dos\country.sys`). Once a country code is loaded, you can use Norton Control Center to change to any other one. The COUNTRY.SYS device driver is found on your original DOS system disks.

Time and Date

Use Time and Date to reset your computer's internal clock. On PC AT-compatible computers, the changes are set into your CMOS memory and will remain active even after you turn off your computer.

Using the Stopwatches

To start a stopwatch from the command line, type `NCC /START:1` at the DOS prompt. The start time is displayed on the screen for the first stopwatch. You can specify watches 1 through 4. If you do not specify a number, the first stopwatch starts.

To stop a stopwatch, type `NCC /STOP:1` at the DOS prompt. The stop time and the elapsed time are displayed.

The real power of the stopwatches is apparent when you use them in batch files. The following example uses Norton Control Center with command-line switches and a few basic DOS techniques. See Appendix C, "Command Line Reference," for a complete summary of Norton Control Center command-line options.

Suppose you must keep track of hours worked on several different projects. If one of them is a computer manual and you want to monitor hours by chapter, create a batch file called MANUAL.BAT with the following contents:

```
NCC /start:1 /c:%1 >> manual.log
wordproc %1
NCC /stop:1 >> manual.log
```

To run the batch file when you want to work on a file called CHAP1.DOC, type `manual chap1.doc` at the DOS prompt.

Whatever you enter on the command line to start the batch file, after the batch file name, is placed wherever the %1 appears in the batch file (this is called a *passed parameter*). In this example, the parameter is the name of the file you want to work on (CHAP1.DOC).

The first line of the batch file starts a stopwatch. The /C: switch tells Norton Control Center to display a comment when it outputs the start time. Here, the comment is the name of the file (the passed parameter). The ">>" symbols redirect the comment and start time in a file called MANUAL.LOG. It is important to note that two greater-than signs are used. This tells DOS to add the information to a file rather than creating a new file or overwriting an existing one (the effect of a single greater-than sign).

The second line of the batch file starts a word processor with the name of the file specified on the command line (again, CHAP1.DOC). Use whatever command is appropriate to start your word processor or other application.

The third line of the batch file is executed when you quit the word processor. The stopwatch is stopped and the stop time and elapsed time are added to the end of the MANUAL.LOG file.

After this session, the MANUAL.LOG file might contain:

```
chap1.doc    3:05 pm, Wednesday, March 17, 1993
             3:50 pm, Wednesday, March 17, 1993
             45 minutes, 23 seconds
```

Each time you use the batch file, the new times and filenames are added to the end of MANUAL.LOG.

Norton Control Center Menu Commands

This section describes the commands in the Norton Control Center pull-down menus.

The File Menu

SAVE SETTINGS: Create a file containing the settings you specified during a Norton Control Center session. You can use this file to load those settings from the command line.

LOAD SETTINGS: Open a settings file you previously created with SAVE SETTINGS to modify the settings it contains.

EXIT: Quit Norton Control Center.

CHAPTER

25 Norton Diagnostics (NDIAGS)

This chapter describes the following:

- Elements of the Norton Diagnostics main screen
- How to display a summary of the major components in your computer
- How to configure serial and parallel communications ports
- How and when to diagnose various hardware components
- How to configure and print diagnostics reports

What It Does

Norton Diagnostics (NDIAGS) is a comprehensive hardware diagnostics utility. It automatically detects and tests a wide range of your computer hardware components, including:

- System board
- Complementary Metal-Oxide Semiconductor (CMOS)
- Conventional, extended, and expanded (EMS) memory
- Hard and floppy disks
- Video adapter and monitor
- Serial and parallel ports
- Keyboard
- Mouse
- Internal speaker

You can override and supplement the information for some of the hardware components Norton Diagnostics detects and tests. Norton Diagnostics can generate a report of the results of a set of selected tests to your printer, a file, or the screen.

TIP: To get the most accurate test results, you may want to start your computer with no unnecessary terminate-and-stay-resident (TSR) programs in AUTOEXEC.BAT or device drivers in CONFIG.SYS. You should also disconnect any devices connected to your serial and parallel ports, with the exception of your mouse.

When to Use It

Use Norton Diagnostics to pinpoint hardware problems when they occur, or as a routine diagnostics tool to locate marginally defective components. For example, suppose you notice that the printer connected to your LPT1 parallel port only works intermittently. Run the Parallel Port 1 test found in the System menu to diagnose the LPT1 port and verify that it is functioning correctly.

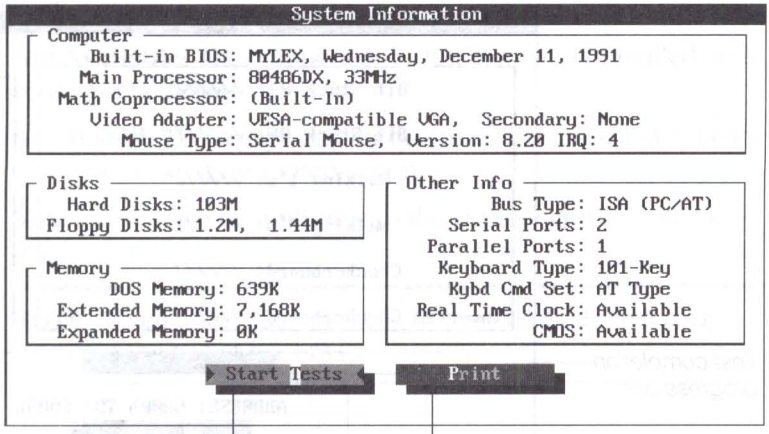
You can also use Norton Diagnostics to check out a used computer for possible defects before you purchase it. MIS personnel can use Norton Diagnostics to diagnose computer problems and generate reports of each computer's operating status.

How to Use It

Choose Diagnostics from the Norton Utilities main screen or type `NDIAGS` at the DOS prompt. The Norton Diagnostics screen appears with the Description dialog box open. This initial dialog box provides general information about Norton Diagnostics; a similar informational dialog box appears prior to each Norton Diagnostics test you run. Once you become familiar with the Norton Diagnostics tests, you can check the Disable Intro. Messages check box in any of the Description dialog boxes so that the messages no longer appear.

Select OK to clear the initial Description dialog box, then select OK again to clear the System Information description. The System Information dialog box shown in Figure 25-1 appears.

Figure 25-1 The System Information dialog box



Begins the first test

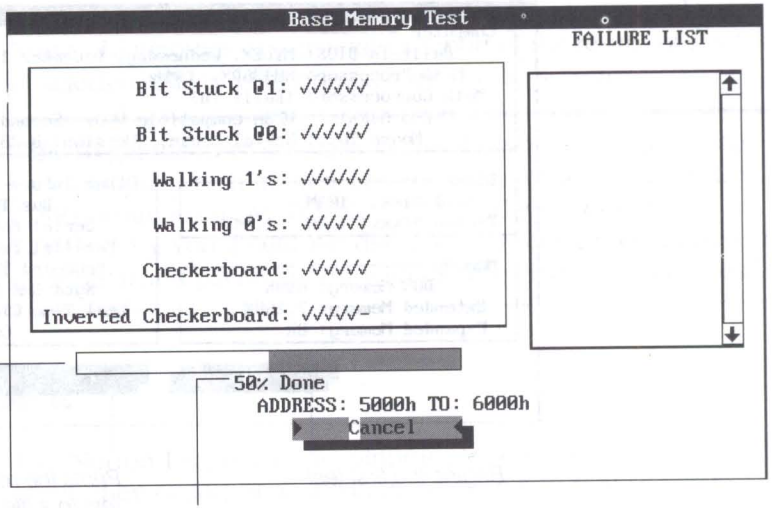
Prints the results of the current test to a file or printer

The System Information dialog box provides a summary listing of the components installed in your system. Use it to verify that Norton Diagnostics is correctly detecting all installed components in your computer. See "Checking the System Information" later in this chapter for instructions on what to do if the system components are reported incorrectly.

Choose the test you want to run from the System, Memory, Disks, Video, Other, or Comprehensive pull-down menu. See "Running the Tests" later in this chapter for details on running each test, and "Norton Diagnostics Menu Commands" for descriptions of each of the menu commands.

When you choose a test, a dialog box for that test appears and charts the test progress and results. For example, choosing the Base Memory Test from the Memory menu displays the Base Memory Test dialog box shown in Figure 25-2.

Figure 25-2 The Base Memory dialog box



If your computer does not have a particular component installed, related tests are unavailable.

When you add components to your system that Norton Diagnostics can test, it automatically detects them and makes the corresponding tests available. The only exceptions are components that you manually configure using HARDWARE CONFIGURATION from the File menu. See "Configuring Norton Diagnostics" later in this chapter for more information.

NOTE: You can also specify tests to run, and print a report for a test, directly from the command line. See Appendix C, "Command Line Reference," for information on the Norton Diagnostics command-line switches.

Understanding the Test Results

The Norton Diagnostics tests can have the following possible results:

Passed: The component or function tested is in good working condition.

Failed: The component or function tested may be defective or malfunctioning.

Not Available: The component or function is not installed and could not be tested.

Not Tested: The component or function is installed but was not tested because of user intervention.

N/A: The test is not applicable to the components installed in your system.

NOTE: When a test fails for the first time, verify the result by repeating the test at least twice.

Running the Tests

This section describes how to run and understand each test in Norton Diagnostics.

Every test dialog box has the following standard command buttons to control program flow and print results.

Next Test: Runs the next test on the same pull-down menu. If the current test is the last one on the menu, the first test in the next menu runs. Tests on the Comprehensive menu are not included.

Repeat Test: Repeats the current test.

Print: Prints the results of the current test to a text file or printer. When the Print Current Information dialog box appears, select the File or Printer command button. If you select File, you are prompted for the filename. Enter the filename and select OK to write the file. If you select Printer, Norton Diagnostics sends the results to the default printer designated as PRN.

To terminate a test before it completes, press Esc then select Cancel in the dialog box that appears. Some test dialog boxes include a Cancel command button when the test is in progress; you can also select this button to terminate a test. The results of any sub-tests that were run during the terminated test are displayed in the test dialog box.

NOTE: The mouse and/or keyboard interrupts are disabled for some portions of a few of the Norton Diagnostics tests. These portions of the tests must complete before the Cancel dialog box appears, so don't be alarmed by a delay after you press Esc.

Checking the System Information

When you choose the INFORMATION command from the System menu, the System Information dialog box appears (see Figure 25-1). It provides a summary listing of the components installed in your system.

NOTE: Norton Diagnostics detects internal modems and reports them as serial ports. If your computer has an internal modem and there are no I/O port address conflicts, you may see an extra serial port reported in the System Information dialog box.

If Norton Diagnostics is incorrectly reporting system components:

Use the HARDWARE CONFIGURATION command in the File menu to change incorrect serial or parallel port I/O and IRQ addresses, as well as keyboard type; see "Configuring Norton Diagnostics" later in this chapter for more information.

Testing the System Board

The System Board Tests test the various components on the system board. They include the central processing unit (CPU), numeric processing unit (NPU), direct memory access (DMA) and interrupt controllers, timers, and the real time clock (RTC).

To run the System Board Tests:

Choose SYSTEM BOARD TEST from the System menu. The System Board Tests dialog box displays the results of the various sub-tests as each test completes.

The CPU Test

The central processing unit (CPU) test is composed of the following sub-tests:

General Test: Validates register shift and rotate functions, 16-bit arithmetic, and conditional branch instructions.

Register Test (CPU): Performs bit pattern tests on each of the CPU registers.

Arithmetic Test (CPU): Verifies that the CPU correctly performs arithmetic calculations.

Protected Mode: Verifies that the CPU can switch between real and protected modes. If you are already in a protected mode environment, such as when running QEMM386, the test passes automatically.

If the CPU sub-tests fail:

Run the Base Memory Test at least three times by choosing BASE MEMORY TEST from the Memory menu. If the Base Memory Test passes consistently, verify that the CPU is firmly socketed on the system board. If the CPU is firmly socketed and no metal components such as exposed wires are touching its surface, you may have a defective CPU.

The NPU Test

If your system has a numeric processing unit (NPU), also known as a math coprocessor, Norton Diagnostics performs the NPU tests. If an NPU is not detected, NOT AVAILABLE is listed for all the sub-tests.

Register Test (NPU): Diagnoses the data registers of the numeric processing unit by performing simple pattern tests on each NPU register.

Arithmetic Test (NPU): Tests the NPU arithmetic functions by comparing the results of addition, subtraction, multiplication, and division of floating point numbers with known results.

Trig Test: Tests the NPU trigonometric functions by performing sine, cosine, and tangent calculations and then comparing the results to known values (386- and 486-based computers only).

Compare Test: Compares the results of 32-bit arithmetic calculations using the NPU to results obtained from the CPU to verify that the NPU and CPU arithmetic functions yield the same results.

If the NPU sub-tests fail:

Run the Base Memory Test at least three times by choosing BASE MEMORY TEST from the Memory menu. If the Base Memory Test passes consistently, verify that the NPU is firmly socketed on the system board. If you have an 80486 CPU, verify that the CPU is firmly socketed since the NPU is built into the CPU. If the component is firmly socketed and no metal components such as exposed wires are touching its surface, you may have a defective NPU.

The Misc Test

The Misc test group tests the DMA and interrupt controllers and the system timers.

DMA Controller: Tests both 8237 DMA controller chips and their registers to verify that the data transfer operations between the CPU and peripheral devices are occurring correctly.

Interrupt Controller: Tests the two 8259A interrupt controllers to verify that they are working correctly.

Timers: Tests the system timers that control the internal clock and speaker.

If the Misc sub-tests fail:

If the DMA Controller sub-test fails consistently, you may need to replace the 8237 DMA controller.

If the Interrupt Controller sub-test fails, one or both 8259A interrupt controllers may be defective, or there may be interrupt vector conflicts. Check the IRQ settings using the HARDWARE CONFIGURATION command in the File menu; see "Configuring Norton Diagnostics" later in this chapter for more information. You should also check for conflicts with network cards, sound cards, and so on.

If the Timers sub-test consistently fails, run the Speaker Test from the Other menu. See "Testing the Speaker" later in this chapter for information on how to run the Speaker Test. If the Speaker Test fails, the timer that controls the speaker on the 8253 timer controller or the speaker itself may be defective.

The Real Time Clock Test

The Real Time Clock (RTC) test group tests the general functions of the RTC and the DOS clock. It also verifies that both clocks are synchronized.

If the Real Time Clock sub-tests fail:

If the RTC Alarm sub-test consistently fails, you may have a nonstandard real time clock chip or the standard Motorola RTC chip may be defective.

If the DOS Clock Test fails consistently but the RTC Alarm sub-test does not, check if the Timers sub-test from the Misc test group passed. If the Timers sub-test failed, you may have a bad timer on the 8253 timer controller.

Otherwise, check the CMOS by choosing CMOS STATUS from the System menu as described in "Testing CMOS Status" later in this chapter. Reset the CMOS time or replace the battery if the CMOS time is invalid or if the battery is dead.

Testing the Serial Port

The serial port tests consist of internal and external sub-tests which test the Universal Asynchronous Receiver/Transmitter (UART) chip-based serial ports. The internal tests, which always run, diagnose the data, control, and status registers of the specified serial port. The optional external tests use a loopback plug to test data throughput through that port.

NOTE: If Norton Diagnostics detects an internal modem occupying the same address and IRQ space as one of your serial ports, or an external modem connected to one of your serial ports, that serial port will be dimmed in the System menu. Modems cannot be tested as normal serial ports.

To run a Serial Port Test:

Choose one of the four serial port tests from the System menu. The internal register tests run first, followed by the external loopback plug test if one is attached to the appropriate serial port. If no loopback plug is detected, the External Serial Test dialog box prompts you to attach the loopback plug.

A serial loopback plug is a device that "loops" the data coming out of the serial port back into it, simulating data transmission and reception without actually communicating with another computer or device. It attaches to the serial port, usually found on the back of your computer, with a male DB-9 (9-pin) or DB-25 (25-pin) receptacle.

See the Customer Service Plan at the back of this user's guide for loopback plug ordering information.

TIP: Leave the loopback plugs attached to unused serial and parallel ports so that the external loopback tests will be automatically performed by Norton Diagnostics.

Attach the loopback plug to the appropriate serial port and select OK. Select Cancel to end the Serial Port Test without performing the loopback plug tests. A dialog box displays the sub-test results after the tests complete.

TIP: If you don't have loopback plugs, or always want to skip the throughput tests, you can disable these tests using the OPTIONS... command in the File menu; see "Configuring Norton Diagnostics" later in this chapter for more information.

When you test a serial port with a loopback plug, Norton Diagnostics displays the maximum data throughput achieved by the tested serial port in bits per second (bps).

If the Serial Port Test fails:

If any of the internal register sub-tests consistently fail, unplug any devices from the serial port and repeat the test. If the sub-tests still fail, verify that you have no I/O address conflicts with other devices such as a mouse, network card, and so forth. If no other device is sharing the same I/O address, you may have a defective serial port.

If any of the external register sub-tests fail when using the loopback plug, check the loopback plug for defects. If the loopback plug is defective, repeat the external sub-tests with a good loopback plug. If they continue to fail and you have already checked for I/O address or IRQ conflicts, you may have a defective serial port.

Don't be alarmed if your system does not achieve the highest data transfer rates. 80286-based PCs running at 8 MHz or less usually cannot transmit data faster than 9600 baud. In most cases, a 25 MHz 80386-based computer can achieve 57,600 baud but not 115,200 baud. Only the fastest 80386- and 80486-based PCs and those equipped with the new First-In-First-Out (FIFO) buffer-equipped 16550 serial ports can transmit data at 115,200 baud.

Testing the Parallel Port

The Parallel Port Tests consist of internal and external sub-tests which test the standard Centronics parallel port. The internal sub-tests, which always run, diagnose the control and data registers of the specified parallel port. The optional Interrupt and Data Throughput Tests use a loopback plug attached to the selected parallel port.

To run a Parallel Port Test:

Choose one of the four parallel port tests from the System menu. The internal sub-tests run first, followed by the external loopback plug tests if one is attached to the appropriate parallel port. If no loopback plug is detected, the External Parallel Test dialog box prompts you to attach the loopback plug.

A parallel loopback plug is a device that "loops" the data coming out of the parallel port back into it, simulating data transmission and reception without actually communicating with another computer or device. It attaches to the parallel port, usually found on the back of your computer. Parallel ports have a female DB-25 plug, which has 25 holes.

Attach the loopback plug to the appropriate parallel port and select OK. Otherwise, select Cancel to end the Parallel Port Test. A dialog box displays the results of the Parallel Port Tests when they complete.

When you test a parallel port with a loopback plug, Norton Diagnostics displays the maximum data throughput achieved by the tested parallel port in kilobytes per second (KBS).

If the Parallel Port Tests fail:

If the internal sub-tests fail, detach any printers or other devices and repeat the sub-tests. If the internal sub-tests still fail, verify that no other hardware device is assigned to the same I/O address. If

the internal sub-tests consistently fail after you resolve any I/O address conflicts, you may have a defective parallel port.

If the external sub-tests fail with a loopback plug, verify that the loopback plug is not defective and repeat the test. If the external sub-tests consistently fail with a good loopback plug and no I/O address or IRQ conflicts exist, you may have a defective parallel port.

Testing CMOS Status

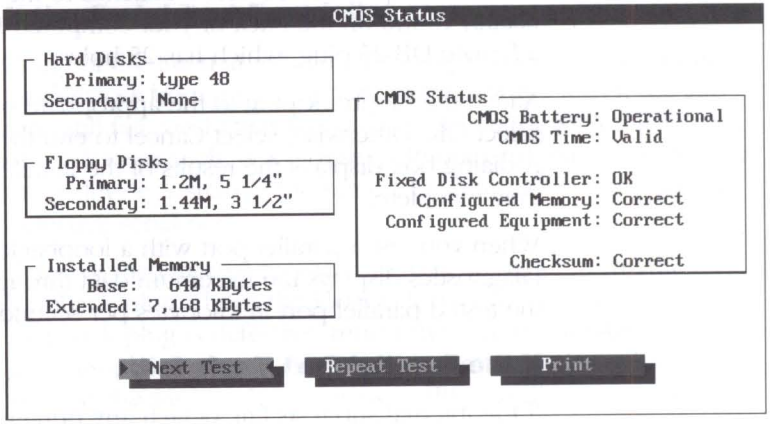
The CMOS STATUS command in the System menu displays the Complementary Metal Oxide Semiconductor (CMOS) information for PC ATs, including the hard and floppy drive types and memory configuration. The CMOS STATUS command also displays the results of the CMOS clock, checksum value, and battery tests conducted by your system during its power-on self-test.

NOTE: The CMOS STATUS menu command is not available on computers without a CMOS chip.

To check the CMOS:

Choose CMOS STATUS from the System menu. The CMOS Status dialog box appears with the CMOS configuration as shown in Figure 25-3.

Figure 25-3 The CMOS Status dialog box



If the CMOS Status reports incorrect values:

First, change the values in the CMOS to the correct values using the BIOS setup program provided by your system, then restart your computer. Refer to your hardware reference manual for more information.

CAUTION: Do not change CMOS values for the hard disk type unless you know the correct value.

If the correct values are not retained, verify that the CMOS battery works and is connected correctly to the system board. If the CMOS still does not retain the correct values, you may have a defective CMOS chip.

Testing the Memory

The Base, Extended, and Expanded (EMS) Memory Tests all perform the same series of sub-tests on base, extended, and expanded memory types. If you don't have extended or expanded memory, the related menu commands are dimmed.

You cannot run the Extended Memory Test with an expanded memory manager driver such as EMM386.EXE, EMM386.SYS, QEMM386.SYS, or 386MAX.SYS loaded. You must remove the memory drivers from CONFIG.SYS and restart your computer before you can run the Extended Memory Test. The only exception is HIMEM.SYS included with recent versions of DOS and Windows.

NOTE: If you have a EMS memory board, you must load the appropriate EMS memory driver in CONFIG.SYS before testing the EMS memory on the board.

To run the memory tests:

Choose BASE MEMORY TEST, EXTENDED MEMORY TEST, or EXPANDED MEMORY (EMS) TEST from the Memory menu.

The test begins and the appropriate dialog box appears. The Failure List list box displays the memory addresses which fail any of the sub-tests described below.

Bit Stuck @1 : Writes 0s to all the memory blocks and reads them back to verify that only 0s are present.

Bit Stuck @0: Writes 1s to all memory blocks and reads them back to verify that only 1s are present.

Walking 1s: Writes 0s to all bit locations then writes, or "walks," a 1 through all the bit locations. Then, each bit written with a 1 is verified to contain a 1, while the other bits remain at 0.

Walking 0s: Writes 1s to all bit locations then writes, or "walks," a 0 through all the bit locations. Then, each bit written with a 0 is verified to contain a 0, while the other bits remain at 0.

Checkerboard: Writes 01010101 to even bytes and 10101010 to odd bytes in the memory block. Then the bytes are read to verify that the correct patterns exist.

Inverted Checkerboard: Writes 10101010 to even bytes and 01010101 to odd bytes. Then the bytes are read to verify that the correct patterns exist.

If the Base, Extended, or Expanded (EMS) Memory Tests fail:

Remove all unnecessary terminate-and-stay-resident (TSR) programs from AUTOEXEC.BAT and device drivers from CONFIG.SYS, restart your computer, and repeat the test. If the test continues to fail, run the Comprehensive Memory Test from the Comprehensive menu. See "Running the Comprehensive Memory Test" later in this chapter for more information.

If the Comprehensive Memory Test also fails consistently and at the same or similar memory addresses, you may have defective memory modules.

Testing the Hard Disks

The hard disk tests perform Sequential and Random Read and Rotation Speed tests on your first or second hard disk.

To run a hard disk test:

Choose HARD DISK 1 TEST or HARD DISK 2 TEST from the Disks menu. The test begins. A dialog box displays the results of each test after it completes.

Sequential Read Test: Reads the first sector on every track on the hard disk. This test ensures that the hard disk head mechanism can position the read/write head accurately over each track.

Random Read Test: Randomly reads sectors on the disk for ten seconds to verify that the drive seek mechanism works properly.

Effective RPM: Measures the effective speed, in revolutions per minute, at which the hard disk platters are spinning to verify that it is within an acceptable range. The measured rotation speed is displayed in RPMs.

NOTE: Most hard drives spin at 3600 RPMs, although some may be faster or slower. Hard Disks equipped with hardware caching controllers may hinder Norton Diagnostics from accurately determining the rotation speed and will be rated much faster than they actually are.

If the hard disk tests consistently fail:

If either of the read tests fail, you may have a defective hard disk. If the Effective RPM test displays an unexpected number, you probably have a hard disk that spins at a different rate than the standard 3600 RPMs or that has a hardware cache.

Testing the Floppy Disks

The floppy disk tests perform Sequential and Random Read, Disk Change, Write Protect, and Rotation Tests. These tests require a formatted floppy disk of the correct size, format, and density for the floppy drive.

CAUTION: Although the floppy drive tests in the Disk menu do not perform write tests, you should not use floppy disks which contain important files. If your floppy drive is not functioning correctly, files on the floppy disk may be damaged.

To run a floppy disk test:

Choose FLOPPY DISK A TEST or FLOPPY DISK B TEST from the Disks menu. The Floppy Test dialog box prompts you to enter a formatted disk into the appropriate drive. Insert the disk and select OK to continue.

The Floppy Drive A: (or B:, depending on which test you are running) dialog box appears and the tests begin. The same dialog box displays the results of the test after the Rotation Test completes.

Sequential Read Test: Reads the first sector on every track on the floppy disk. This test ensures that the floppy drive head mechanism can position the read/write head accurately over each track.

Random Read Test: Randomly reads sectors from the floppy disk to verify that the drive seek mechanism works properly.

Disk Change Test: Tests that the floppy drive can detect a change of floppy disks.

Write Protect Test: Verifies that the floppy drive can recognize the write protect tabs on floppy disks.

Rotation Test: Tests the floppy drive to verify the rotation speed is within tolerance levels (the tolerance is two percent). The rotation speed is measured and displayed in revolutions per minute (RPM).

If the floppy disk tests consistently fail:

If only the read tests fail, repeat the test with another formatted floppy disk. If the read tests continue to fail, you may need to clean, recalibrate, or replace the read/write heads of the floppy drive.

If the Disk Change or Write Protect Tests fail continuously, you may have defective disk change and write protect detection mechanisms.

If the Rotation Test fails and your floppy drive is not working correctly, the floppy drive motor may be defective. This test will fail if the measured speed is outside the two-percent tolerance level.

Testing the Video Adapter Memory

The Video Memory Test tests the video RAM and memory paging hardware of your video adapter.

To run the Video Memory Test:

Choose MEMORY TEST from the Video menu. A message box appears to inform you that the screen will be distorted while the video memory is tested. Select OK to begin the test.

When the test completes, the Video Memory Test dialog box displays the result.

If the Video Memory Test consistently fails:

The video memory, DRAM or VRAM, may be defective.

Testing the Video Adapter Modes

The Video Mode Tests diagnose the video modes of your video adapter.

To run the Video Mode Tests:

Choose MODE TEST from the Video menu. An initial dialog box appears with instructions on how to run the test. Select OK to begin the test.

Each standard video mode supported by your video adapter is displayed with the prompt "This is MODE XX Press Y for OK, N for Bad, ESC to Quit," where XX refers to the video mode in hexadecimal. Enter Y to pass or N to fail the test for the current mode, or Esc to cancel the remaining mode tests.

After the Video Mode Tests end, the Video Mode dialog box lists each mode with the test results.

If video modes do not display correctly:

Repeat the Video Mode Test several times to verify that the same video modes do not display correctly. If so, your video adapter may not support all of the standard modes of adapters of its type, you may have a monitor that cannot display the same video modes as the video adapter can, or the video adapter or monitor may be defective.

Testing the Video Grid

The Video Grid Tests verify that your video monitor can display straight and even grid lines in every standard video mode supported by the video adapter. If your monitor has an adjustment control, you can use it to improve the grid displays. Refer to the monitor manufacturer's manual for more information.

To run the Video Grid Tests:

Choose GRID TEST from the Video menu. A message box appears with instructions on how to run the test. Select OK to begin the test.

Grid lines are displayed in every standard mode supported by your video adapter with the prompt "This is MODE XX Press Y for OK, N for Bad, ESC to Quit," where XX refers to the video mode in hexadecimal. Enter Y to pass or N to fail the test for the current mode, or Esc to cancel the remaining mode tests.

When the Video Grid Tests complete, the Video Grid Tests dialog box lists the test results for each mode.

If the grids are not displayed correctly:

Repeat the Video Grid Tests several times after adjusting the display with an appropriate control if available. If the grids are still severely skewed and uneven, you may have a defective video monitor or video adapter.

Testing the Video Color

The Video Color Tests test the quality and purity of the colors displayed by your monitor. Depending on your video adapter and monitor, Norton Diagnostics can test up to 256 colors.

To run the Video Color Tests:

Choose COLOR TEST from the Video menu. A message box appears with instructions on how to run the test. Select OK to begin the test.

Norton Diagnostics displays red, green, and blue colors, which are used to create all other colors, and prompts you to verify the color purity. Check that the color displays evenly in all areas of the screen. Enter Y to pass or N to fail the current test, or Esc to cancel the remaining color tests.

Next, each color set for the standard video modes supported by your video adapter is displayed along with a confirmation prompt.

When the Video Color Tests complete, the Video Color Tests dialog box lists the test results for each color set.

If the Video Color Tests fail:

If the red, green, and blue colors are washed out, faded, or spotty, you may have a defective monitor. If the other multi-color tests do not appear correct, you may have a defective video adapter or monitor.

Testing the Mouse

The Mouse Test diagnoses your mouse, the mouse driver, and the mouse interface to verify that all are working properly.

NOTE: The Mouse Test requires a mouse driver to run. Refer to your mouse manual for information on how to load the mouse driver.

To run the Mouse Test:

Choose MOUSE TEST from the Other menu. Follow the on-screen instructions when prompted to move the mouse and click its buttons. The Left Button and Right Button labels at the bottom of the Mouse Test dialog box display PRESSED when you press the corresponding button and RELEASED otherwise.

When you move the mouse, the Mouse Test dialog box displays the position. On a normal DOS screen of 80 by 25 characters, X Position displays a value between 0 and 79 while Y Position displays a value between 0 and 24. The position for the upper-left corner of the screen is 0,0.

After the test completes, the Mouse Test dialog box displays the results.

If the Mouse Test fails:

Clean the mouse tracking system and repeat the test. Refer to your mouse manual for cleaning instructions. If the test fails, obtain the latest version of the mouse driver and repeat the test. Refer to your mouse manual for information on how to contact the manufacturer for the most current mouse driver.

If the mouse behaves erratically, verify that you have no I/O address or IRQ conflicts with other hardware devices and communications ports and repeat the test.

If you have a bus mouse, the mouse or the bus mouse port may be defective. For a serial mouse, detach the mouse and run the appropriate Serial Port Test from the System menu to verify that the serial port is working correctly. See "Testing the Serial Port" earlier in this chapter for more information. If the serial port is good, you may have a defective mouse. Try attaching the mouse to another serial port.

Testing the Speaker

The Speaker Test generates sound through your computer's built-in speaker. You decide whether the sound was generated correctly.

To run the Speaker Test:

Choose SPEAKER TEST from the Other menu. The sound is generated through your speaker and a message box asks you "Was the speaker audible?" Select Yes if you heard the sound clearly and No if you did not.

The Speaker Test dialog box displays the results for the Speaker Test.

NOTE: Do not move the mouse during the Speaker Test. Doing so produces interrupts that can interfere with the sound production software.

If the Speaker Test fails:

Try running other applications which also generate sounds. If the speaker does not generate the correct sounds, run the System Board Tests from the System menu. See "Testing the System Board" earlier in this chapter for more information. If the Timers sub-test of the Misc test group also fails, you may have a defective timer controller. Otherwise, verify that the speaker is correctly wired to the system board. If so, you may have a defective speaker.

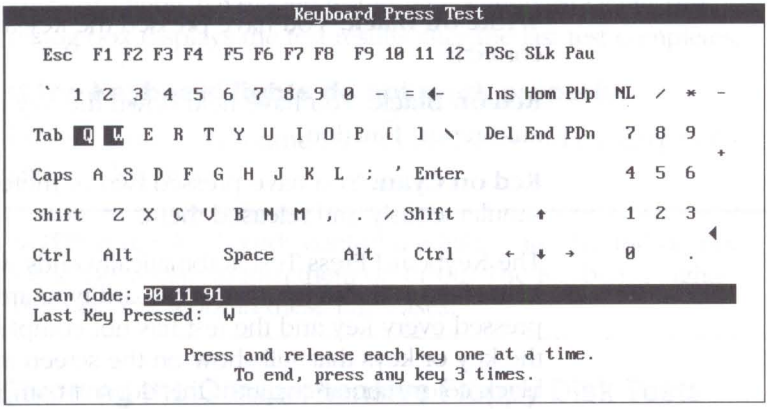
Testing the Keyboard

The Keyboard Press Test diagnoses your keyboard to verify that each key is working correctly.

To test your keyboard:

Choose KEYBOARD PRESS TEST from the Other menu. The Keyboard Press Test dialog box shown in Figure 25-4 appears.

Figure 25-4 The Keyboard Press Test dialog box


Keyboard Press Test
Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 10 11 12 PSc SLk Pau
` 1 2 3 4 5 6 7 8 9 0 - = ← Ins Hom PUp NL / * -
Tab Q W E R T Y U I O P [ ] \ Del End PDn 7 8 9 +
Caps A S D F G H J K L ; ' Enter 4 5 6
Shift Z X C V B N M , . / Shift ↑ 1 2 3
Ctrl Alt Space Alt Ctrl ← ↓ → 0 .
Scan Code: 00 11 91
Last Key Pressed: W
Press and release each key one at a time.
To end, press any key 3 times.

NOTE: If your keyboard layout differs significantly from the screen (for example, if it has a different number of keys), you may be configured for the wrong keyboard type or you may have a nonstandard keyboard. If you're configured for the wrong keyboard type, choose HARDWARE CONFIGURATION from the File menu to choose the correct keyboard type. If you have a nonstandard keyboard type, you can still run the test but you may have to tell the system whether the test passes or fails.

Each time you press a key on your keyboard, a unique electronic signal called a scan code is generated. Norton Diagnostics displays the scan code in hexadecimal so that you can verify it. Most keys generate a scan code when a key is pressed and another when the key is released. Some produce multiple scan codes when a key is pressed and released.

During the Keyboard Press Test, press every key at least once. Do not press multiple keys simultaneously since this can simulate a stuck key or a defective keyboard auto-repeat function. Press any key three times in succession to exit the test.

The Keyboard Press Test uses the following color schemes to represent key press states when you are using the Norton Utilities EGA/VGA Colors #1 screen color scheme. Changing the screen colors also changes the color scheme used for the keys. See Chapter 27, "Norton Utilities Configuration (NUCONFIG)," for more information on setting screen colors.

Black on Cyan: The key is not pressed.

White on Black: You have pressed the key and it is working correctly.

Red on Black: You have held down the key and activated the auto-repeat function.

Red on Cyan: You have pressed two or more keys simultaneously and released them.

The Keyboard Press Test automatically ends with a passed status after all scan codes for your keyboard type are detected. If you pressed every key and the test has not completed, try pressing the key or keys that still show on the screen in the white-on-black color scheme again. If this doesn't complete the test, press any key three times. A dialog box appears prompting you to select Passed, Failed, or Cancel to end the test, or Resume to continue the test. Select Failed if your keyboard layout matches the one on the screen, you pressed every key, and one or more keys were not detected. Choose Passed if you have a nonstandard keyboard and every key you pressed appears to operate correctly.

The Keyboard Test dialog box displays the test result once the test completes.

When a key does not work properly:

Verify that the keyboard is firmly plugged in to the keyboard port and that no object is inadvertently pressing down on a key. Check for physically damaged keys or keyboard wire, exposed circuitry, and so forth. If your keyboard has a switch to work with both PC XT and PC AT computers, verify that it is set to the proper position. Refer to your keyboard manual for more information. If the same keys still don't work properly, you may have a defective keyboard.

Testing the Keyboard Lights

The Keyboard Lights Test verifies that the NumLock, CapsLock, and Scroll Lock keyboard lights work.

To test the keyboard lights:

Choose KEYBOARD LIGHTS TEST from the Other menu. Follow the on-screen instructions provided in the Keyboard Status Light

Test dialog box until the NumLock, CapsLock, and Scroll Lock keyboard lights have been tested. The Keyboard Lights Test dialog box displays the test results after the last test completes.

If the keyboard lights do not work properly:

Either the lights are burned out or the keyboard circuitry to the lights is defective.

NOTE: A few keyboards control the lights directly, and do not allow the system to turn them on or off. The Keyboard Lights Test may not work in these rare cases.

Running the Comprehensive Floppy Disk Tests

The Comprehensive Floppy Disk A and B Tests perform Sequential and Random Read/Write Tests on the floppy disks. You need a formatted floppy disk of the correct size and density for these tests.

WARNING: The Comprehensive Floppy Disk A and B Tests destroys all existing data on the test floppy disk. Do not use a disk with important data on it.

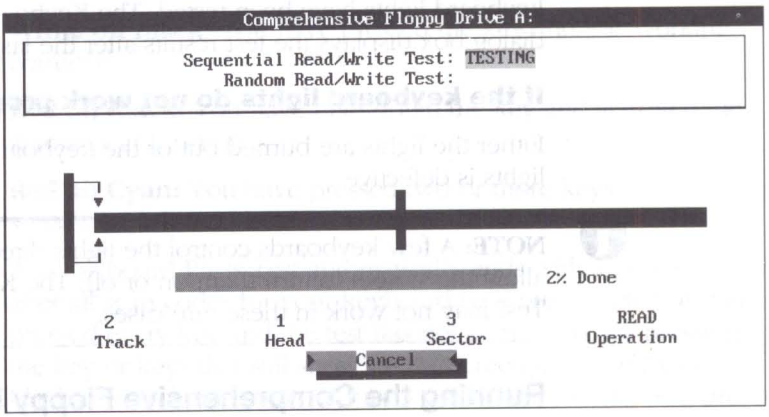
To run a comprehensive floppy disk test:

Choose FLOPPY DISK A TEST or FLOPPY DISK B TEST from the Comprehensive menu. A message box prompts you to insert a formatted disk into the appropriate floppy drive. Insert the disk and select OK.

If the floppy disk you inserted contains files, the Floppy Test dialog box alerts you and prompts for approval to overwrite the files or cancel the test.

During the test, a dialog box displays the test progress as shown in Figure 25-5. Typically, Norton Diagnostics takes about 30 to 40 minutes to comprehensively test a 3½-inch 1.44 MB high-density floppy drive.

Figure 25-5 The Comprehensive Floppy Drive A: dialog box



The dialog box displays the test results when the last sector has been tested.

Sequential Read/Write Test: Performs a sequential read and write test on every sector on the floppy disk. Tests both the media of the floppy disk and general operation of the floppy drive and controller.

Random Read/Write Test: Performs a random read and write test to comprehensively test the seek mechanism of the floppy drive.

If the Comprehensive Floppy Disk Tests fail:

Repeat the test with another floppy disk. If the tests continue to fail, the floppy drive read/write head may need cleaning, recalibration, or replacement. In addition, the seek mechanism may be defective.

Running Calibrate

If you are having problems with your hard drive, run the Norton Utilities Calibrate program to detect problems. If the problem is a disk surface defect, Calibrate repairs the problem by moving the data and marking one or more clusters as bad.

To run Calibrate:

Choose RUN CALIBRAT from the Comprehensive menu. See Chapter 7, "Calibrate (CALIBRAT)," for complete information on Calibrate.

Running the Comprehensive Memory Test

The Comprehensive Memory Test thoroughly tests installed memory in your computer. Its exhaustive read, write, and verify test algorithm can take hours or even days to complete. Test time depends on the amount of memory and the processing speed of your computer.

NOTE: Hardware-based EMS memory is not tested. Extended memory that emulates EMS through a memory manager such as EMM386, QEMM386, and 386MAX is tested.

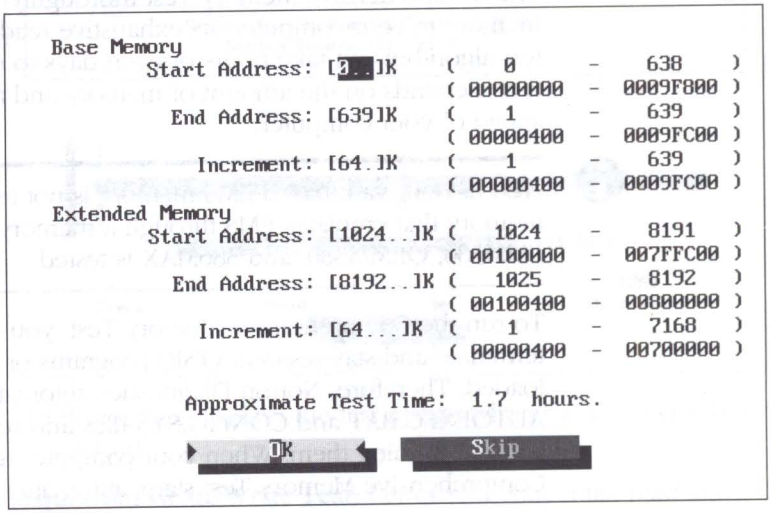
To run the Comprehensive Memory Test, you must not have any terminate-and-stay-resident (TSR) programs or device drivers loaded. Therefore, Norton Diagnostics automatically saves your AUTOEXEC.BAT and CONFIG.SYS files and restarts your system without running them. When your computer restarts, the Comprehensive Memory Test starts automatically.

To run the Comprehensive Memory Test:

Choose MEMORY TEST from the Comprehensive menu. A message box informs you that your computer will be restarted and that the Comprehensive Memory Test will begin automatically.

Select OK to configure the test. The memory configuration screen shown in Figure 25-6 appears with default values calculated specifically for your computer.

Figure 25-6 The Comprehensive Memory Test configuration screen



In most cases, you want to begin the test with the default values. However, you can change the values for the Start and End Addresses and the Increment size.

Start Address: Defines the starting memory address to begin testing. The default values for base and extended memory are 0K and 1024K.

End Address: Defines the ending memory address to end testing. For base or conventional memory, it usually is 639K, or total installed. For extended memory, the default is the largest extended memory address. For example, if you system is equipped with 8 MB of total memory, the ending extended memory address would be 8192K.

NOTE: Certain computers map some RAM into shadow RAM, and it becomes unavailable. The upper address may be reduced by as much as 256K in these cases.

Increment: Defines the block size that Norton Diagnostics is to use during the test. The larger the block size, the longer the test.

Approximate Test Time: Displays the approximate time in hours that the test will take to complete.

NOTE: For best results, set the Increment value to the size of the memory module or chip. For example, if your system uses 1 MB Single In-line Memory Modules (SIMMs), set the Increment size to 1024K. If your system memory is populated by 64K Dynamic RAM (DRAM), set the Increment value to 64K.

Select OK to begin the Comprehensive Memory Test or Skip to return to the Comprehensive Memory Test dialog box without running the test. A warning box appears when you select OK, asking if you want to proceed. Again, select OK to continue or Cancel to skip the test.

The Comprehensive Memory Test dialog box displays the results when the test completes.

If the Comprehensive Memory Test detects bad memory addresses:

Repeat the Comprehensive Memory Test using a different Increment size. If the same memory addresses still fail the test, confirm by running all of the memory tests from the Memory menu. See "Testing the Memory" earlier in this chapter for more information. If the Memory menu tests also fail the same memory addresses, you may have defective memory modules.

Running the 16550A Serial Port Test

The 16650A Universal Asynchronous Receiver/Transmitter (UART) serial interface chip provides more efficient high-speed serial input/output, increasing the speed of a serial port dramatically over the earlier 8250 and 16450 UARTs. Unlike the 8250 or 16450 UARTs, which have only a one-byte receive buffer, the 16550A UART has two 16-byte internal FIFO (First-In-First-Out) buffers for transferring and receiving data. These buffers allow more time for the serial port to read incoming characters before falling behind or loosing data.

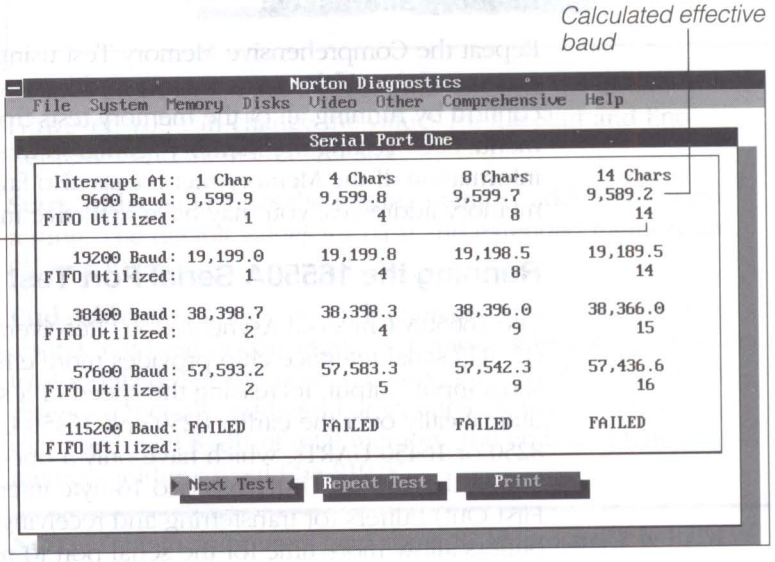
A FIFO Control Register allows you to specify how often to send an interrupt to the CPU for processing incoming data. You can send interrupts at every 1, 4, 8, or 24 characters received, depending on whether you want higher speed (24) or greater reliability (1 or 4 in multitasking modes with higher priority interrupts).

The 16550A Serial Port Test shows you how well a 1655A-equipped serial port's FIFO buffers are operating. Normally, the amount of the buffer used should at least equal the interrupt setting. You should also run the Norton Diagnostics common serial port tests to examine the port's basic functions. To run the 16550A Serial Port Test, you must have the 16550A UART serial interface chip installed for one of your serial ports, and you must have a loopback plug connected to that serial port.

To test your 16550A FIFO buffer:

Choose 16550 1, 2, 3, or 4 (depending on which port is equipped with the 16550A UART) from the Comprehensive menu. The test begins automatically with the dialog box shown in Figure 25-7.

Figure 25-7 The Serial Port dialog box


Calculated effective baud
Number of bytes used in the FIFO buffer at any one time
Norton Diagnostics
File System Memory Disks Video Other Comprehensive Help
Serial Port One
Interrupt At: 1 Char 4 Chars 8 Chars 14 Chars
9600 Baud: 9,599.9 9,599.8 9,599.7 9,589.2
FIFO Utilized: 1 4 8 14
19200 Baud: 19,199.0 19,199.8 19,198.5 19,189.5
FIFO Utilized: 1 4 8 14
38400 Baud: 38,398.7 38,398.3 38,396.0 38,366.0
FIFO Utilized: 2 4 9 15
57600 Baud: 57,593.2 57,583.3 57,542.3 57,436.6
FIFO Utilized: 2 5 9 16
115200 Baud: FAILED FAILED FAILED FAILED
FIFO Utilized:
Next Test
Repeat Test
Print

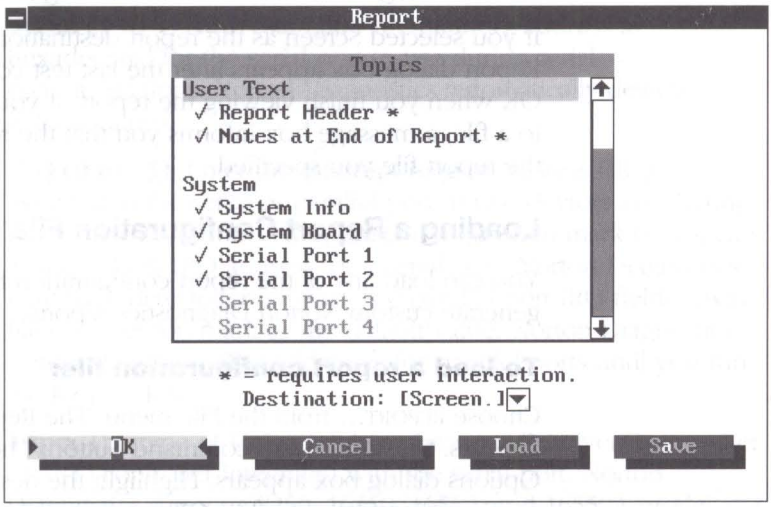
Generating a Report

Norton Diagnostics generates reports that you can send to a DOS file, the screen, or to your printer. You can add a report header and notes to the report. You can also customize a report to run a specific set of tests, then save the configuration to a file.

To generate a report:

Choose REPORT... from the File menu. Select the tests to run in the Topics list box of the Report dialog box as shown in Figure 25-8. Verify that a checkmark appears next to the test name. If no checkmark appears, highlight the test and press Spacebar to select it. You must be present during tests marked with an asterisk (*) because they require user interaction.

Figure 25-8 The Report Dialog box



Select the destination for the report from the Destination drop-down list box. Selecting Screen, the default destination, displays the report in a list box on the screen after all the tests have completed. Selecting File generates the report to a DOS file which you can view. Selecting Printer prints the report to your default printer.

When you finish configuring the report, you can save the configuration. Select the Save command button and enter the name for the report configuration file in the Save Report Options dialog box. Select OK to write the file. Norton Diagnostics creates the report configuration file with the name you provide and an .NDR extension.

Select OK in the Report dialog box to begin the tests selected for the report. Norton Diagnostics prompts you for the filename of the report if you selected File as the destination. Enter the

filename or use the default filename (NDIAGS.RPT) and select OK to continue.

Enter up to 40 characters for the optional report header when the Report Header dialog box appears. Norton Diagnostics inserts the header at the beginning of the report. Select OK to continue.

In the User Notes dialog box, you can optionally enter a note to append to the end of the report. Select OK to accept the note or Cancel to begin the tests without attaching a note.

If you selected Screen as the report destination, the NDiags Report dialog box appears after the last test completes. Select OK when you finish viewing the report. If you saved the report to a file, a message box informs you that the results were sent to the report file you specified.

Loading a Report Configuration File

You can load any of the report configuration files you saved to generate custom Norton Diagnostics reports.

To load a report configuration file:

Choose REPORT... from the File menu. The Report dialog box appears. Select the Load command button. The Load Report Options dialog box appears. Highlight the desired report configuration file and select OK.

Configuring Norton Diagnostics

You can configure Norton Diagnostics to recognize specific I/O port addresses, IRQ addresses, and controller types for your serial and parallel ports. You can also manually specify the keyboard type if Norton Diagnostics cannot determine the correct type automatically.

Configuring Serial and Parallel Ports

Manually configure the serial and parallel ports if your computer has more than four serial or parallel ports or if Norton Diagnostics cannot automatically detect them.

NOTE: If you are not sure what I/O port address, IRQ address, or controller to enter, do not manually configure your serial or parallel ports.

To configure your ports manually:

Choose HARDWARE CONFIGURATION from the File menu. Modify the address, IRQ, and controller type (serial ports only) as necessary in the Hardware Configuration dialog box.

Serial (1 to 4) Address: Enter the memory address in hexadecimal for the serial port to use during serial communications. Norton Diagnostics automatically detects default values.

IRQ (0 to 15): Enter the interrupt request address (IRQ) assigned to the serial or parallel port. If two devices are sharing the same IRQ, conflicts may arise. If a question mark (?) appears as the default IRQ address for a serial port, Norton Diagnostics may have detected a conflict. The parallel port IRQ fields always have a question mark as the default value; Norton Diagnostics cannot determine IRQ addresses for parallel ports until you run the loopback test.

Type: The type of Universal Asynchronous Receiver/Transmitter (UART) controller integrated with the serial port. Norton Diagnostics supports 8250, 16450, 16550, and 16550A model UART controllers. In addition, if your computer has an internal modem occupying the same address and IRQ space as one of the serial ports, or you have an external modem connected to a serial port and it's turned on, the type will be listed as Modem.

Parallel (A to D) Address: The memory address for the parallel port.

Configuring the Keyboard

Manually configure your keyboard if Norton Diagnostics cannot automatically determine the keyboard type, or if your keyboard is not standard and you want to choose the most similar type.

Norton Diagnostics supports three widely used keyboard types: 84-key, 101-key, and 102-key. The 84-key keyboard has 10

function keys on the left side. The 101-key and 102-key keyboards have 12 function keys across the top.

NOTE: The 102-key keyboard is found primarily in Europe.

To change the keyboard type:

Choose HARDWARE CONFIGURATION from the File menu. The Hardware Configuration dialog box appears. Select the appropriate keyboard type from the Keyboard Type drop-down list box and select OK.

Configuring Norton Diagnostics Options

Set the Use Loopback Plugs option to perform loopback tests for the serial and parallel ports. Activate the Display Introductory Screens option to automatically display introductory help screens for each test.

To configure options for Norton Diagnostics:

Choose OPTIONS... from the File menu. The Options dialog box appears. Check the check boxes for the features you want and select OK.

Norton Diagnostics Menu Commands

This section lists all the pull-down menu commands available in Norton Diagnostics.

The File Menu

HARDWARE CONFIGURATION: Configures serial and parallel ports and keyboard type.

OPTIONS...: Sets options for loopback plug tests and introduction screens.

REPORT...: Generates a report of selected tests to a file or the screen. You can save and load report configurations to and from a file.

EXIT: Quits Norton Diagnostics.

The System Menu

INFORMATION: Displays a summary of all the components installed in your computer.

SYSTEM BOARD TEST: Diagnoses the CPU, the NPU if present, DMA and Interrupt Controllers, Real Time Clock, and other components on the system board.

SERIAL PORT 1: Tests the internal control and status registers on the COM1 serial port. If the Use Loopback Plugs feature is enabled, runs the external loopback tests.

SERIAL PORT 2: Tests the internal control and status registers on the COM2 serial port. If the Use Loopback Plugs feature is enabled, runs the external loopback tests.

SERIAL PORT 3: Tests the internal control and status registers on the COM3 serial port. If the Use Loopback Plugs feature is enabled, runs the external loopback tests.

SERIAL PORT 4: Tests the internal control and status registers on the COM4 serial port. If the Use Loopback Plugs feature is enabled, runs the external loopback tests.

A PARALLEL PORT 1: Diagnoses the control and data registers on the LPT1 parallel port. If Use Loopback Plugs feature is enabled, runs the Data Throughput test.

B PARALLEL PORT 2: Diagnoses the control and data registers on the LPT2 parallel port. If Use Loopback Plugs feature is enabled, runs the Data Throughput test.

C PARALLEL PORT 3: Diagnoses the control and data registers on the LPT3 parallel port. If Use Loopback Plugs feature is enabled, runs the Data Throughput test.

D PARALLEL PORT 4: Diagnoses the control and data registers on the LPT4 parallel port. If Use Loopback Plugs feature is enabled, runs the Data Throughput test.

CMOS STATUS: Tests and displays the CMOS values for installed hard disks, floppy disks, and memory (Base, EMS, and XMS). Displays the condition of the CMOS battery and other CMOS information.

The Memory Menu

BASE MEMORY TEST: Diagnoses the first 640K of your computer's memory, known as base or conventional memory.

EXTENDED MEMORY TEST: Directly tests installed extended memory. You must restart your computer without an EMS or XMS memory manager to run this test.

EXPANDED MEMORY (EMS) TEST: Diagnoses installed expanded memory. Tests both hardware- and software-based EMS memory. Software based EMS memory is available on 80386- and 80486-class computers with EMS memory managers.

The Disks Menu

HARD DISK 1 TEST: Performs read (sequential and random) and rotation tests on the first physical hard disk.

HARD DISK 2 TEST: Performs read (sequential and random) and rotation tests on the second physical hard disk.

FLOPPY DISK A TEST: Performs read, rotation, disk change, and write-protect tests on the A: floppy drive. You need a formatted floppy disk for this test.

FLOPPY DISK B TEST: Performs read, rotation, disk change, and write-protect tests on the B: floppy drive. You need a formatted floppy disk for this test.

The Video Menu

MEMORY TEST: Diagnoses the video adapter's video memory, during which the test distorts the screen for a few seconds.

MODE TEST: Tests the video modes of the video adapter. You must pass or fail the tests based on the quality and accuracy of the display.

GRID TEST: Tests the ability of the video adapter and monitor to display grids in the video modes. You must pass or fail the tests based on how accurate the grids appear.

COLOR TEST: Diagnoses the ability of the video adapter and monitor to display supported colors correctly. You must pass or fail the tests based on the purity and clarity of the colors displayed.

The Other Menu

MOUSE TEST: Tests the mouse, mouse driver, and mouse interface. You must move the mouse pointer and operate the mouse buttons to generate the mouse signals to test.

SPEAKER TEST: Tests the internal speaker by generating a sound which you verify.

KEYBOARD PRESS TEST: Tests all keys on the keyboard with the aid of a graphical display. You pass or fail the test after pressing each key at least once and verifying that all keys are working properly.

KEYBOARD LIGHTS TEST: Checks the keyboard status lights for the NumLock, CapsLock, and Scroll Lock keys. You pass or fail the test by verifying that the lights turn on and off properly.

The Comprehensive Menu

FLOPPY DISK A TEST: Performs sequential and random read and write tests on the floppy drive. The test performs read and write operations on every track, head, and sector on the test floppy disk. You need a formatted floppy disk for this test.

CAUTION: The Comprehensive Floppy Disk Tests destroy all data stored on the test floppy disk. Do not use a floppy disk that contains important data.

FLOPPY DISK B TEST: Performs sequential and random read and write tests on the B: floppy drive. The test performs read and write operations on every track, head, and sector on the test floppy disk. You need a formatted floppy disk for this test.

RUN CALIBRAT: Runs the Norton Utilities Calibrate program. Calibrate diagnoses all aspects of your hard disk and the hard disk controller, including a complete pattern testing routine. See Chapter 7, "Calibrate (CALIBRAT)," for more information on how to use Calibrate.

MEMORY TEST: Runs the Comprehensive Memory Test to thoroughly test all memory installed in your system.

16550 1: Tests the 16550A First-In-First-Out (FIFO) equipped serial port on COM1.

16550 2: Tests the 16550A First-In-First-Out (FIFO) equipped serial port on COM2.

16550 3: Tests the 16550A First-In-First-Out (FIFO) equipped serial port on COM3.

16550 4: Tests the 16550A First-In-First-Out (FIFO) equipped serial port on COM4.

CHAPTER

26 Norton Disk Doctor (NDD)

This chapter describes using Norton Disk Doctor to:

- Determine the health of your disks
- Correct disk errors
- Configure the disk diagnosis process
- Generate diagnostic reports

See "Diagnosing Disks with Norton Disk Doctor" in Chapter 3, "Recovery Tutorials," for the step-by-step procedures to diagnose a disk.

What It Does

Norton Disk Doctor (NDD) runs numerous tests to determine the health of your disks. It warns you if problems are found and gives you the option of correcting them. The tests and corrections are performed automatically. When the tests complete, Norton Disk Doctor generates a report about your disk. If testing is interrupted, you can print a report on what was tested. For extra safety, you can undo any changes Norton Disk Doctor performs.

The Norton Disk Doctor Tests

Norton Disk Doctor automatically performs a series of general tests to discover where problems may lie and then, optionally, tests the physical surface of your disk.

Partition Table Test: A hard drive is partitioned into one or more logical disks. The partition table defines the partition

structure. If the data in a partition table becomes damaged in any way, DOS may not be able to access the hard disk at all.

Boot Record Test: The boot record sector tells DOS about disk characteristics such as size and other technical information. If the boot record becomes damaged, DOS may not be able to access the disk properly.

FAT Test: The file allocation table (FAT) enables DOS to find all the data belonging to a file. If the FAT is damaged, DOS may not be able to access one or more files properly.

Directory Structure Test: The directory structure enables DOS to find files on the disk. If the directory structure becomes damaged, DOS may not be able to access portions of directories or even entire directories on the disk.

File Structure Test: The File Structure Test makes sure that each file's directory entry matches its FAT entry. In other words, the directory structure and the FAT must find the same things.

Lost Cluster Test: Looks for clusters that contain valid data but cannot be linked with any known file.

Compression Structures: A compressed drive is really a special file on your hard drive. If this file is damaged, you may not be able to access data on your compressed drive. The compression structure test verifies the integrity of the file.

Surface Test: Checks for physical defects on the disk. If you use the Surface Test on a regular basis and notice the same problems occurring, your disk could be developing major problems. Be sure to make frequent backups of your data.

For more information on the areas Norton Disk Doctor tests, see Appendix A, "Disk Companion."

When to Use It

Use Norton Disk Doctor when you have trouble accessing a disk or you notice problems when you try to run applications. You can also use it if your computer will not start and you suspect problems with the boot disk or partition, or if files or directories seem to be missing but were never deleted.

TIP: Practice preventative maintenance by running Norton Disk Doctor regularly. Choose STARTUP PROGRAMS... from the Norton Utilities main screen's Configuration menu and select Diagnose Disk Problems. This places the necessary command in your AUTOEXEC.BAT file so that Norton Disk Doctor runs a quick test of your hard disk every time you start your computer.

How to Use It

When using Norton Disk Doctor to diagnose and repair a problem disk, operate in full-screen mode. Use command-line switches for routine maintenance, such as a diagnosis of your disk every time you start up your computer. See Appendix C, "Command Line Reference," for more information on using the Norton Disk Doctor command-line switches.

Although Norton Disk Doctor can be run from a network, you cannot test network drives.

To diagnose a disk:

Choose Disk Doctor from the Norton Utilities main screen, or type NDD at the DOS prompt. Choose Diagnose Disk from the Norton Disk Doctor main menu and highlight the drive to diagnose. To diagnose more than one drive, press Spacebar on each desired drive. Then select Diagnose to begin the suite of tests.

After the tests complete, the Surface Test dialog box appears. This test is optional, but you should run the surface test at least once each week. You can change the surface test default settings from this dialog box, if desired. See "Configuring Norton Disk Doctor" later in this chapter for more information on surface test options.

If you're testing a compressed drive, Norton Disk Doctor makes two passes: the uncompressed or host drive is checked first, then the compressed drive is checked.

To correct errors:

If Norton Disk Doctor finds an error, it displays a screen explaining the problem and asks for your permission to correct it. Simply follow the screen prompts to fix the error.

NOTE: When Norton Disk Doctor fixes lost clusters or lost chains, it optionally creates files in the root directory with names like FILE0000._DD, FILE0001._DD, and so on. Sometimes these files contain lost data; more often, they just contain garbage. Examine the files to make sure they do not contain any valuable data, then delete them. See "Diagnosing Disks with Norton Disk Doctor" in Chapter 3, "Recovery Tutorials," for more information on lost clusters.

To create an UnDo file:

Before fixing your disk, Norton Disk Doctor asks if you want to create an UnDo file—just in case the changes were not what you expected and you want to restore the disk to its original troubled condition. Norton Disk Doctor saves disk changes in a file called NDDUNDO.DAT. You'll need a floppy disk for the UnDo file. Follow the screen prompts to create the file.

NOTE: If Norton Disk Doctor prompts you to create more than one UnDo file, you must use a different disk for each UnDo file.

To undo disk changes that were made the last time you ran Norton Disk Doctor:

Select Undo Changes on the Norton Disk Doctor main menu, then select the letter of the drive containing the UnDo file. Norton Disk Doctor searches for the NDDUNDO.DAT file and restores the disk to its original condition. If you have more than one UnDo file, you must restore them in the reverse order of creation.

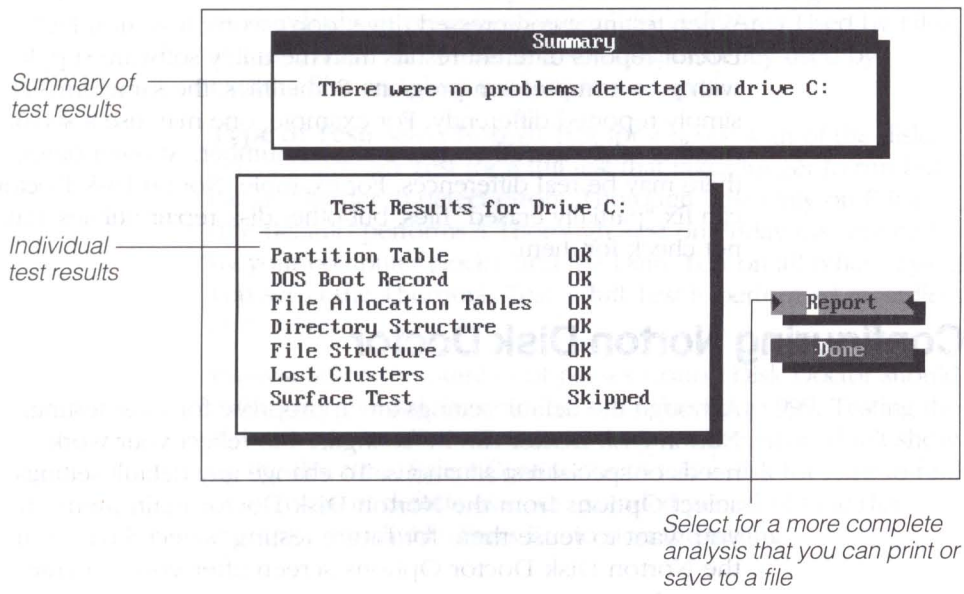
WARNING: If any changes have been made to the disk after Norton Disk Doctor completes its repairs, do not undo the changes because the UnDo file is no longer valid.

To generate a report of test results:

When testing completes, a brief summary screen shows the results of all tests as illustrated in Figure 26-1. Select Report to generate a more complete report which you can save to a file or print. This is optional, but highly recommended, as it is the only record of what occurred during testing.

TIP: If Norton Disk Doctor finds any errors, save the report to a disk other than the one you are testing to make sure that you do not write to a potentially damaged disk.

Figure 26-1 Norton Disk Doctor summary report


Summary of test results
Summary
There were no problems detected on drive C:
Individual test results
Test Results for Drive C:
Partition Table OK
DOS Boot Record OK
File Allocation Tables OK
Directory Structure OK
File Structure OK
Lost Clusters OK
Surface Test Skipped
Report
Done
Select for a more complete analysis that you can print or save to a file

The tests results are defined as follows:

OK	No problems were found
Fixed	The problems found were fixed
Skipped	The test was skipped
Not Fixed	Problems were detected but not corrected
Cancelled	The test was cancelled

Compressed Drives

Norton Disk Doctor also diagnoses and repairs compressed drives.

Compressed drives work by storing a large hidden file in the root directory of an uncompressed DOS disk, called the *host disk*. When testing compressed drives, Norton Disk Doctor makes two passes. The first pass tests the host (or uncompressed) disk, while the second pass tests the compressed drive. For each pass, Norton Disk Doctor prompts you to run a surface test. On the host drive, the surface test verifies the physical disk media. On the compressed drive, the surface test checks the integrity of the compressed drive.

When testing a compressed drive, don't worry if Norton Disk Doctor reports different results than the utility software supplied with your compression program. Sometimes, the same error is simply reported differently. For example, one may use a sector number while the other uses a cluster number. At other times, there may be real differences. For example, Norton Disk Doctor can fix "partially erased" files, but other disk repair utilities may not check for them.

Configuring Norton Disk Doctor

Although the default settings are appropriate for most testing, Norton Disk Doctor can be configured to reflect your work needs or special test situations. To change any default settings, select Options from the Norton Disk Doctor main menu. If you want to reuse them for future testing, select Save from the Norton Disk Doctor Options screen after you've made your changes.

General

The General options let you configure certain aspects of Norton Disk Doctor behavior. For example, you can specify whether or not to perform the surface test (it can be time consuming) as part of regular testing. If you choose to disable the test, make sure you explicitly run a surface test occasionally.

You can also identify which tests to skip if you have a nonstandard disk system. For example, you may have an older computer that does not accurately report certain components. Or, you might skip the Partition Tests if you're using security software that encodes partition tables.

Surface Test

Surface Test has three options. Select Surface Test from the Norton Disk Doctor Options screen to configure the Surface Test settings.

What to Test: Select Entire Disk Area to test every section of the disk for bad areas. This option slows down the diagnosis, but a thorough check is made of your entire disk. Area Used by Files is faster; however, it tests only the area currently used by existing files and does not test unused space.

Type of Test: Select Normal Test for a quick scan of the disk. Select Thorough Test for a full test that takes longer to run but catches harder to detect errors. Thorough Test Only on Fridays (the default) performs a Thorough Test on Friday (as reported by your computer clock), and the Daily Test on all other days. If you select the Thorough Test, a full Test is performed regardless of the day.

Passes: Select the number of passes Norton Disk Doctor should make over the disk by entering any value up to 999. Testing the disk once is usually sufficient; however, some errors don't show up the first time. Select Continuous to test a disk for hard-to-find or intermittent defects over an extended period of time (for example, overnight). Press Esc to stop the testing.

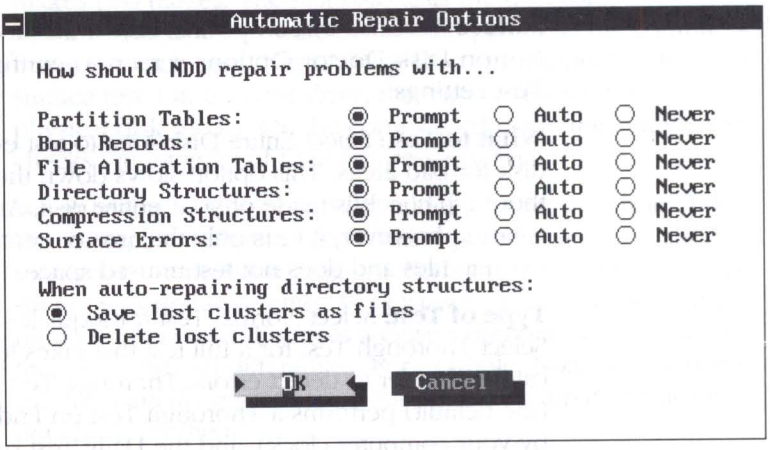
Custom Message

Use this option if you are configuring Norton Disk Doctor for other users and want them to call you if a problem arises. Select Custom Message from the Norton Disk Doctor Options screen to specify a message for Norton Disk Doctor to display (such as "Call for MIS"). If any errors are encountered, the user can't proceed and is returned to the Norton Disk Doctor main menu.

Auto-Repair

These options, illustrated in Figure 26-2, determine what Norton Disk Doctor does if an error is encountered. For each test performed, you can specify one of three actions (by default, it's Prompt for all errors).

Figure 26-2 Automatic Repair Options dialog box


Automatic Repair Options
How should NDD repair problems with...
Partition Tables: Prompt Auto Never
Boot Records: Prompt Auto Never
File Allocation Tables: Prompt Auto Never
Directory Structures: Prompt Auto Never
Compression Structures: Prompt Auto Never
Surface Errors: Prompt Auto Never
When auto-repairing directory structures:
Save lost clusters as files
Delete lost clusters
OK
Cancel

Never: Diagnoses the disk without fixing any errors that are encountered.

Prompt: Lets you see where the error was found and then decide if you want a repair made.

Auto: Automatically repairs the disk without prompting.

When auto-repairing directory structures, you can specify if you want lost clusters saved.

Norton Disk Doctor Commands

Norton Disk Doctor commands are issued with command buttons rather than pull-down menu commands. This section lists all commands available in the Norton Disk Doctor main menu.

Diagnose Disk: Select one or more drives to test. The general tests are performed and then, optionally, the Surface Test.

Surface Test: Select one or more drives for the Surface Test. The general tests are skipped.

Undo Changes: Select the drive containing the UnDo file to return the disk to its condition before Norton Disk Doctor made any changes.

Options: See "Configuring Norton Disk Doctor" earlier in this chapter for a complete discussion of the Norton Disk Doctor options.

Quit Disk Doctor: Exit Norton Disk Doctor.

CHAPTER

27 Norton Utilities Configuration (NUCONFIG)

This chapter explains how to configure Norton Utilities options. It describes how to:

- Set video and mouse options
- Create, edit, and delete printer configurations
- Specify custom paths for temporary and swap files
- Set and remove passwords on certain utilities
- Install and remove device drivers or programs from your computer's startup files (CONFIG.SYS and AUTOEXEC.BAT)
- Lock and unlock Norton program menu items
- Select alternate names for various utilities

What It Does

With this utility you can set up your interface options, control which utilities users have access to, make certain utilities run at startup, and use two-letter names for certain utilities. Norton Utilities Configuration (NUCONFIG) provides several more options than the initial installation process.

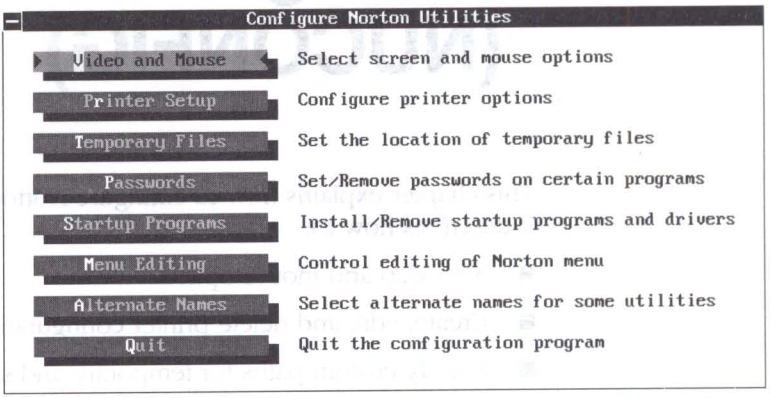
When to Use It

After installing Norton Utilities, use Norton Utilities Configuration any time to change the way the Norton Utilities programs interact with your system.

How to Use It

Choose Configuration from the Norton Utilities main screen, or type NUCONFIG at the DOS prompt. The Configure Norton Utilities dialog box appears as shown in Figure 27-1.

Figure 27-1 Configure Norton Utilities dialog box



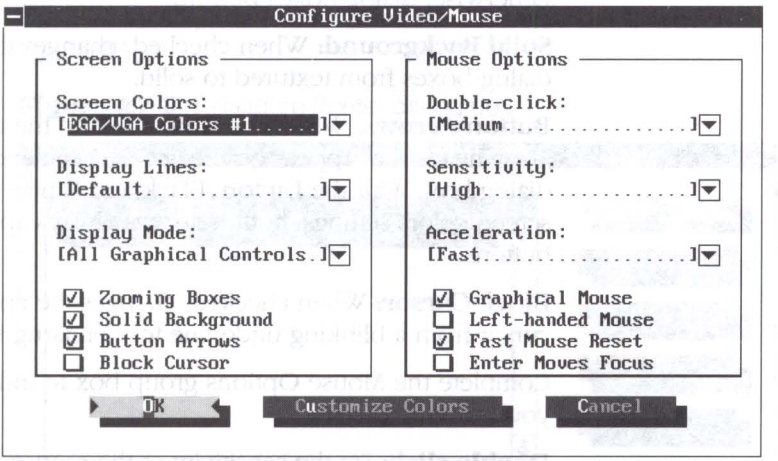
To set configuration options, you can also use the Configuration menu commands on the Norton Utilities main screen.

The following sections describe the Configure Norton Utilities dialog box command buttons.

Video and Mouse

Set video and mouse options for the Norton Utilities as shown in Figure 27-2.

Figure 27-2 Configure Video/Mouse dialog box



Check the check boxes and select option buttons in the Screen Options group box for each option you want.

Screen Colors: Configure Norton Utilities so that it displays correctly on a variety of monitors and video adapters. On EGA and VGA monitors, choose between two color configurations, or set your own colors using the Customize Colors command button.

Display Lines: Change the number of lines on your display, which changes the image size on your screen.

Display Mode: Change the appearance of dialog boxes.

- **Standard:** Display parentheses for option buttons, square brackets for check boxes, and no graphical icons.
- **Some Graphical Controls:** Display round option buttons and square check boxes, but no special graphical icons appear in dialog boxes.
- **All Graphical Controls:** Display graphical icons in dialog boxes.

NOTE: The Graphical options are available only on EGA or VGA monitors.

Zooming Boxes: When checked, dialog boxes zoom open. Otherwise, dialog boxes pop up.

Solid Background: When checked, changes the background of dialog boxes from textured to solid.

Button Arrows: When checked, turns on the triangular arrowheads that appear on the active command button in a dialog box. With the Laptop, Black and White, or Monochrome screen colors settings, button arrows always appear on active buttons.

Block Cursor: When checked, changes the appearance of the cursor from a blinking underline to a blinking block.

Complete the Mouse Options group box to indicate settings you want.

Double-click: Set the sensitivity of the mouse click speed.

Sensitivity: Set the mouse speed.

Acceleration: Set the mouse response to accelerated movement.

Graphical Mouse: When checked, displays the mouse cursor as a small arrow rather than a box.

Left-handed Mouse: When checked, configures your mouse for left-handed use.

Fast Mouse Reset: When checked, selects fast mouse reset for serial, IBM PS/2, and Compaq mouse ports. If you have trouble using your mouse with a Norton program, try unchecking this check box.

Enter Moves Focus: When checked, you press Enter to move between dialog box control groups. Use a combination of Ctrl+Enter to accept actions in dialog boxes.

Customize Colors: Change the colors of your screen elements.

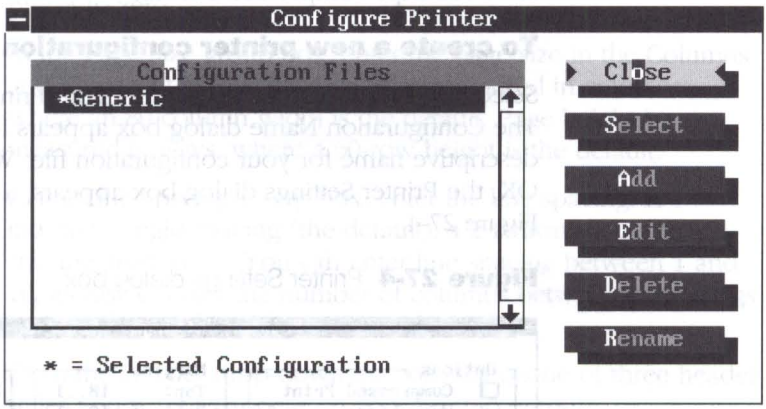
To customize colors:

Select the Customize Colors command button. A dialog box appears where you select the colors. A list box shows changeable items, along with a sample window of your selections. Select the Color button to view and change the color combinations for an item.

Printer Setup

Create custom printer settings for the Line Print utility (see Figure 27-3).

Figure 27-3 Configure Printer dialog box



Close: Exit the Configure Printer dialog box.

Select: Select the highlighted configuration file. With a selected printer configuration file, you need only specify the filename after typing the command LP (Line Print) to print your file with your custom printer setup.

Add: Create a new printer configuration file. See the procedure below for more information on creating a new printer configuration file.

Edit: View and edit the settings of the highlighted configuration file from the Printer Settings dialog box shown in Figure 27-4.

Delete: Delete the highlighted configuration file; a confirmation box appears before the deletion.

Rename: Rename the highlighted configuration file; a text box appears where you can enter a new name.

Configuration Files: Select, add, edit, delete, and rename files from this list to use custom formats for printing your text files with Line Print.

If you sometimes use more than one printer or document format, you can create a new printer configuration description for each. With these configurations you can switch printers or formats by just selecting the correct configuration file. You do

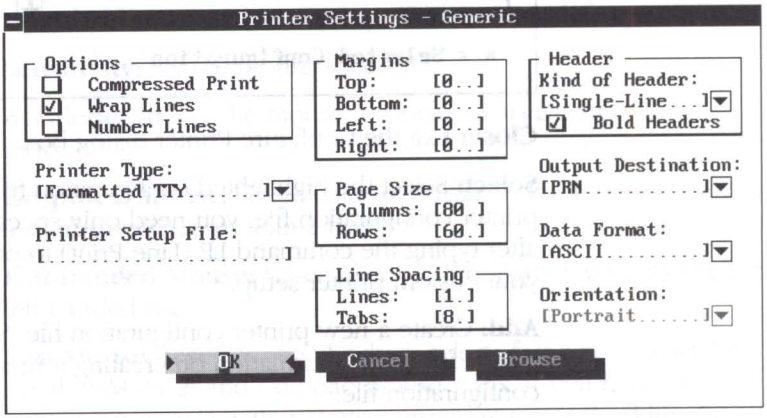
not need to specify each switch every time you use the Line Print utility. Here are some examples of descriptive names you can create:

- HP LaserJet Landscape
- Postscript Compressed Portrait

To create a new printer configuration file:

Select the Add button from the Configure Printer dialog box. The Configuration Name dialog box appears for you to enter a descriptive name for your configuration file. When you select OK, the Printer Settings dialog box appears, as shown in Figure 27-4.

Figure 27-4 Printer Settings dialog box



Specify printer options in this dialog box.

Compressed Print: Print data in compressed mode.

Wrap Lines: Automatically wrap your text so you don't need to place a carriage return at the end of each line of text to force a line break.

Number Lines: Sequentially number each line of your output in the left margin.

Printer Type: Select the type of printer you are using from this drop-down list box.

Printer Setup File: Enter the filename of an optional setup file. Select the Browse button to select the setup file from the Printer

Setup File dialog box. If the setup file is not stored in the Norton Utilities directory, include the complete path with the filename.

In the Margins group box, enter the margins in the text boxes. Top and bottom margin settings are measured in rows. Left and right margin settings are measured in columns. All margins are preset to zero.

In the Page Size group box, enter the page size in the Columns and Rows text boxes. Page width is measured in columns, where an 80-column width is the default. Page height is measured in rows, where a 60-row height is the default.

In the Line Spacing group box, enter the line spacing. A 1 indicates single spacing (the default), a 2 indicates double spacing, and so on. You can enter line spacing between 1 and 10, inclusive. Enter the number of columns between tab settings in the Tabs text box (8 is the default setting).

From the Header drop-down list box, select one of three header styles you want to appear on your printed output.

None: Suppress the header information so no header appears on your output.

Single-Line: Print the filename, current date and time, and page number at the top of each page.

Two-Line: Print the filename, current date and time, page number, and the file's creation or last modification date at the top of each page.

Bold Headers: Print the headers in bold text.

Output Destination: Select where your output should be directed.

Data Format: Select the format of your data.

- ASCII: Uses eight bits to define each character (the default setting). Most of the time, data is in the ASCII format.
- Wordstar: Uses the first seven bits to define the character and the eighth bit for control information.
- EBCDIC: Used only by mainframe computers and IBM DisplayWrite. Select EBCDIC to print files downloaded from a mainframe computer to a PC.

Orientation: Select the page orientation. This option is dimmed unless you have specified a PostScript or HP LaserJet printer as your printer type.

- Portrait: Prints your data so the page orientation is taller than it is wide (the default setting).
- Landscape: Prints your data so the page orientation is wider than it is tall.

Temporary Files

Change the location used to store swap files or temporary files. A dialog box displays the following choices:

Swap Directory: Change the directory for storing swap files. Swap files create temporary files on disk to store data that is moving from one location to another.

Temporary Directory: Change the directory for storing temporary file data. These files are NU work files.

OK: Select this command button when you see the directories that you want to use.

Cancel: Select this command button if you make changes that you don't want to keep.

Browse: Scan and choose a different directory with this graphical directory display.

Passwords

Set the passwords for specific Norton Utilities to prevent unauthorized use. You can set a password for any of the following utilities: Calibrate, Disk Editor, Disk Tools, File Fix, Norton Disk Doctor, Norton Diagnostics, Configuration, Safe Format, Speed Disk, UnErase, UnFormat, and Wipe Information.

Norton Utilities Configuration allows only one password for all utilities you select.

CAUTION: You *must* remember the password you set or you won't be able to use any of the password-protected programs.

To enter a password:

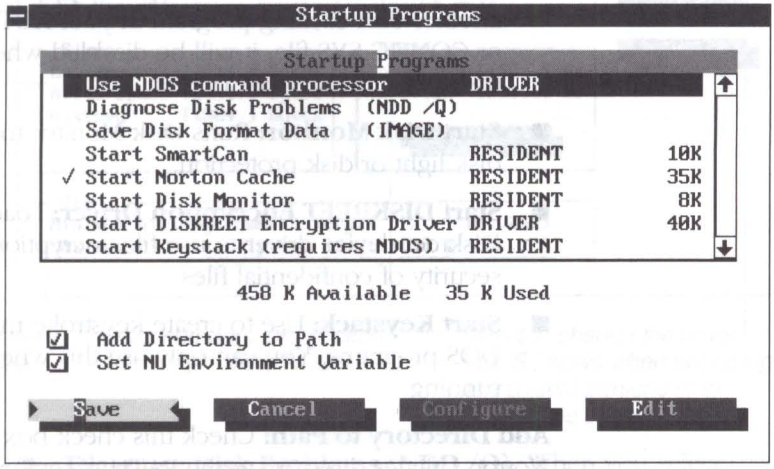
Press the Spacebar to place a checkmark next to the utilities that you want to protect. Select OK. Type a password of up to 15 characters in the dialog box that appears and select OK. Type your password again when Norton Utilities Configuration asks you to verify it.

To remove password protection from a program, press the Spacebar to uncheck the program name. To remove the password protection from all the programs, select the Remove All command button. Then select OK to make the changes. Entering a blank password removes any previous password.

Startup Programs

Choose Startup Programs from the Configure Norton Utilities dialog box to run useful Norton Utilities programs each time you start your computer. The Startup Programs dialog box appears as shown in Figure 27-5. A checkmark appears next to the selected programs.

Figure 27-5 Startup Programs dialog box



To select startup programs:

Select a program by highlighting the program name and pressing Spacebar or clicking the program name. Select Save to add the commands that run these programs to your AUTOEXEC.BAT or CONFIG.SYS file.

If you don't want a program to run at startup, deselect it by pressing Spacebar or clicking the program name again to remove the checkmark.

- **Use NDOS Command Processor:** Installs NDOS.COM in place of COMMAND.COM to enhance the DOS environment.
- **Diagnose Disk Problems:** Runs Norton Disk Doctor to check for problems on your disk.
- **Save Disk Format Data:** Runs Image to take a "snapshot" of the system area of your disk for better recovery from an accidental format.
- **Start SmartCan:** Runs SmartCan to protect deleted files so you can recover them with more accuracy.
- **Start Norton Cache:** Runs Norton Cache to speed up disk access. The Norton Cache dialog box appears when you select this program. See Chapter 5, "Performance Tutorials," and Chapter 22, "Norton Cache (NCACHE2)," for more information on options and installation. Do not select this option if your computer has less than 1 MB of memory available. If you have another disk caching program in your AUTOEXEC.BAT or CONFIG.SYS file, it will be disabled when you select the Start Norton Cache option.
- **Start Disk Monitor:** Runs Disk Monitor to enable the disk light or disk protection.
- **Start DISKREET Encryption Driver:** Loads the Diskreet device driver to use file encryption for greater security of confidential files.
- **Start Keystack:** Use to create keystroke macros for DOS programs. You can only use this when NDOS is running.

Add Directory to Path: Check this check box to add the Norton Utilities directory to the PATH statement in your AUTOEXEC.BAT file.

Set NU Environment Variable: Check this check box to set the NU environment variable to the Norton Utilities program directory.

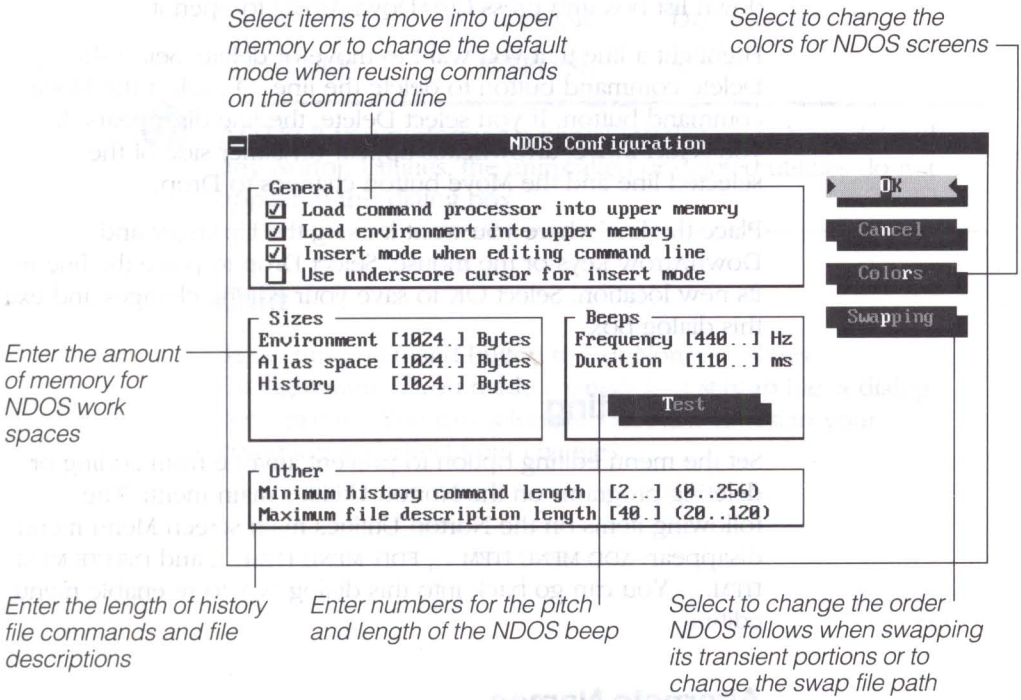
Save: Select when you're finished specifying startup programs. The commands that run the programs are added to your startup files.

To change the startup configuration of any of the programs:

Highlight the program name and select the Configure command button. Each configurable program has its own configure dialog box.

- **NDOS:** When you select the Configure command button for NDOS, the dialog box in Figure 27-6 appears.

Figure 27-6 NDOS Configuration dialog box


Select items to move into upper memory or to change the default mode when reusing commands on the command line
Select to change the colors for NDOS screens
NDOS Configuration
General
Load command processor into upper memory
Load environment into upper memory
Insert mode when editing command line
Use underscore cursor for insert mode
OK
Cancel
Colors
Swapping
Sizes
Environment [1024.] Bytes
Alias space [1024.] Bytes
History [1024.] Bytes
Beeps
Frequency [440..] Hz
Duration [110..] ms
Test
Other
Minimum history command length [2..] (0..256)
Maximum file description length [40.] (20..120)
Enter the amount of memory for NDOS work spaces
Enter the length of history file commands and file descriptions
Enter numbers for the pitch and length of the NDOS beep
Select to change the order NDOS follows when swapping its transient portions or to change the swap file path

- **Diagnose Disk Problems (NDD /Q):** When you select the Configure command button for NDD, a dialog box appears for you to select a disk to check.
- **Save Disk Format Data (IMAGE):** When you select the Configure command button for Image, a dialog box appears for you to select a disk to protect.

- **Start Norton Cache:** When you select the Configure command button for Norton Cache, a dialog box appears for you to configure the cache.
- **Start Disk Monitor:** When you select the Configure command button for Disk Monitor, a dialog box appears for you to select which functions to activate.

To modify your AUTOEXEC.BAT or CONFIG.SYS file manually:

Select Edit. The Editing Startup Files dialog box appears showing your AUTOEXEC.BAT file. Any lines that Norton Utilities Configure changed are highlighted or red. If you want to edit your other startup file (CONFIG.SYS), highlight the File drop-down list box and press Ctrl+DownArrow to open it.

Highlight a line that you want to move or delete. Select the Delete command button to delete the line. Or, select the Move command button. If you select Delete, the line disappears. If you select Move, arrowheads appear on either side of the selected line and the Move button changes to Drop.

Place the line where you want it using the UpArrow and DownArrow keys or the mouse. Select Drop to place the line in its new location. Select OK to save your editing changes and exit this dialog box.

Menu Editing

Set the menu editing option to prevent anyone from adding or deleting programs on the Norton Utilities main menu. The following items on the Norton Utilities main screen Menu menu disappear: ADD MENU ITEM..., EDIT MENU ITEM..., and DELETE MENU ITEM.... You can go back into this dialog box to re-enable menu editing.

Alternate Names

Set the Alternate Names option to abbreviate names for those utilities that you often use at the DOS prompt.

To choose alternate names:

Select the name you want to use for each program from the drop-down list boxes in the Alternate Program Names dialog box, or select the All Short or All Long command button. The alternate names available for each program are listed below.

Utility	Long Name	Alternate Name
Disk Editor	DISKEDIT	DE
File Find	FILEFIND	FF
Safe Format	SFORMAT	SF or FORMAT
System Information	SYSINFO	SI
Duplicate Disk	DUPDISK	DD or DISKCOPY
Speed Disk	SPEEDISK	SD

NOTE: If you performed a partial installation or have deleted any Norton Utilities, the uninstalled or deleted utilities do not appear in this dialog box.

Quit

Select this command button to exit Norton Utilities Configuration. If you made changes to a startup file, a dialog box appears. You can select Reboot Now to restart your computer and effect your changes.

CHAPTER

28 Rescue Disk (RESCUE)

This chapter provides information on using a rescue disk to help you recover from a hard disk emergency, it describes:

- The information Rescue Disk puts onto a disk
- The types of crashes from which the rescue disk recovers

What It Does

Rescue Disk (RESCUE) creates a rescue disk unique to your computer. Then, in the event of an emergency, Rescue Disk restores your computer using the information on the rescue disk.

When to Use It

Use Rescue Disk to create a rescue disk immediately after installing the Norton Utilities as a preventive measure to recover from system crashes.

Restore your system from your rescue disk if you lose your system configuration stored in Complementary Metal-Oxide Semiconductor RAM (CMOS RAM). Otherwise, you will not be able to access your hard disk. In addition, use your rescue disk to restore your system if you see the following error messages when you start your computer: "Hard drive not found," "Missing operating system," or "Non-DOS disk error."

TIP: Update the rescue disk anytime you change your computer's partition tables or logical drive assignments.

How to Use It

Choose Rescue Disk from the Norton Utilities main screen or type RESCUE at the DOS prompt. The Rescue Disk dialog box appears. Select the procedure that you need to perform (Create or Restore).

If you are using Rescue Disk to restore your system, you must first put the rescue disk in your floppy disk drive, then type RESCUE at the DOS prompt.

For information on using Rescue Disk from the DOS prompt, see Appendix C, "Command Line Reference."

Create

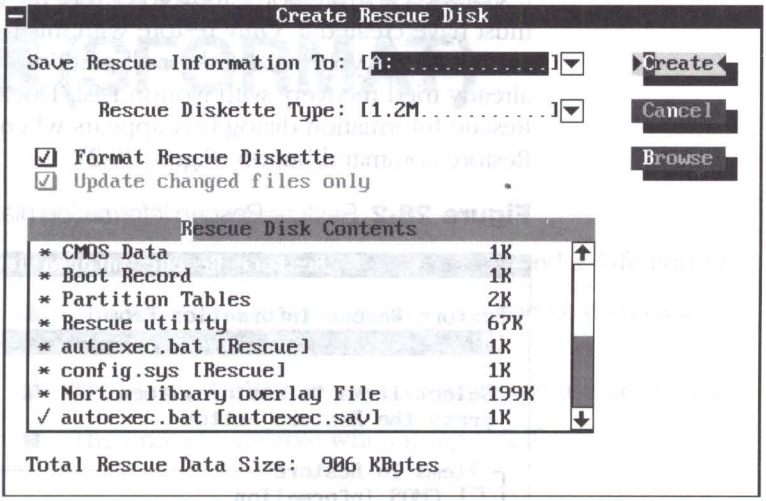
Select the Create command button from the Rescue Disk dialog box to save vital hard disk and system information on a bootable floppy disk. You can then rescue your hard disk if you ever lose any of the following information:

- **CMOS Values:** Provides information about the hard drives.
- **Boot Record:** The first 512 bytes on a disk is the boot record and it contains two elements: the BIOS Parameter Block that describes the physical layout of the disk to the system providing partition information used to access data within a partition and the bootstrap loader routine that tells the system where on the disk to load the operating system.
- **Partition Tables:** Provides a record of where FDISK divided the hard disk into drives.

Rescue Disk also puts copies of startup files, drivers, and several utilities useful for rescuing a disk on your rescue disk.

When you select the Create command button, the Create Rescue Disk dialog box appears (Figure 28-1).

Figure 28-1 Create Rescue Disk dialog box



You can set the following options for creating your custom rescue disk:

Save Rescue Information To: Select the drive to which you are saving the rescue information.

Rescue Diskette Type: Select the proper capacity for your rescue disk.

Format Rescue Diskette: Check this check box if you know your disk is not yet formatted, you want to clear old information from the disk before using it as the rescue disk, or you want to make it a startup disk.

Update Changed Files Only: Check this check box if you already made a rescue disk and you want to reconfigure it with new system information or put additional utilities on it.

Rescue Disk Contents: Select or deselect files or utilities that you want on the rescue disk from this list box.

Create: Create the rescue disk using the selected options.

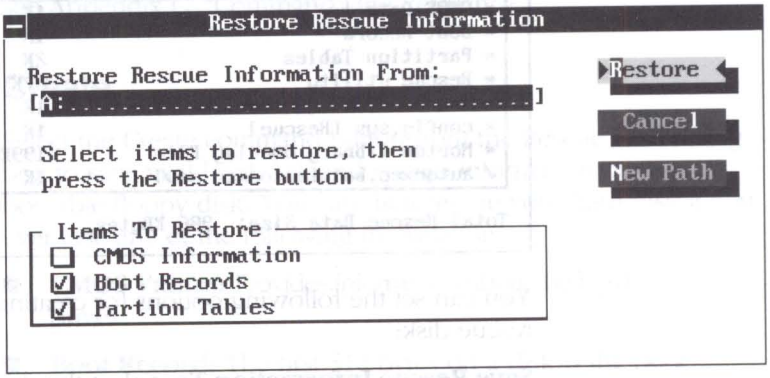
Cancel: Exit this dialog box without performing any actions.

Browse: Find other utilities or programs that you want on the rescue disk.

Restore

Select the Restore command button from the Rescue Disk dialog box to restore your hard disk and system information from your rescue disk. Before you can restore from the rescue disk, you must have created it. Only restore with this procedure if you cannot access your hard disk or all partitions on it, and you've already tried recovery with Norton Disk Doctor. The Restore Rescue Information dialog box appears when you select the Restore command button (Figure 28-2).

Figure 28-2 Restore Rescue Information dialog box



You can set the following options for restoring your hard disk from your rescue disk:

Restore Rescue Information From: Type the drive or pathname of the rescue drive or file location in this text box.

Items to Restore: Check the check boxes for the items your computer requires to recover from its crash: CMOS Information, Boot Records, or Partition Tables.

Restore: Select this command button after selecting the location of the rescue files and items to restore.

Cancel: Exit the Restore procedure without performing any actions.

New Path: Display a dialog box where you can select the path of the rescue information.

CHAPTER

29 Safe Format (SFORMAT)

This chapter describes:

- The difference between a DOS format and a Safe Format
- The procedure to replace your DOS format command with Safe Format
- The reason UnFormat succeeds when you use Safe Format
- The options available when using Safe Format

What It Does

Safe Format (SFORMAT) formats disks faster than the DOS FORMAT command and enables you to completely recover data from an unintentionally (safe) formatted disk. Safe Format also makes formatting easier by providing more options than DOS FORMAT and a menu if you choose to use it. These options include leaving space for system files if you want to make the disk bootable in the future, performing a Quick format, saving the disk's Image information, and choosing from a wider range of format capacities.

Disk formatting can be either low-level or high-level.

- A low-level format destroys all the data on the floppy disk (hard disks only receive high-level formats). Formatting a floppy disk with the DOS FORMAT command from earlier DOS versions performs only a low-level format.

- A high-level format only resets the information in the system area, making the disk available for new data; it does not overwrite data. Even though the disk appears empty, the file data is still there. When you format a disk with Safe Format's Safe or Quick formatting mode, you perform a high-level format. When formatting a hard disk, you also perform a high-level format.

UnFormat effectively recovers accidentally formatted disks from high-level formats when you specify the Save Image Info option when performing a Safe Format.

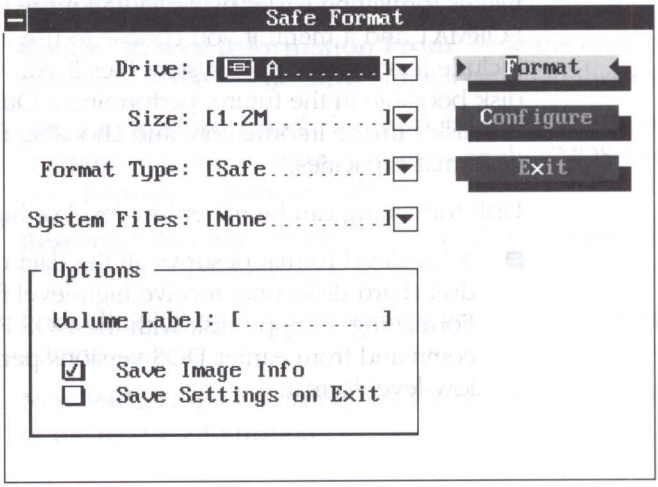
When to Use It

Use Safe Format to format a new disk, to reformat a floppy or hard disk, or to quickly erase many files from a disk.

How to Use It

Choose Safe Format from the Norton Utilities main screen or type SFORMAT at the DOS prompt. The Safe Format dialog box in Figure 29-1 appears.

Figure 29-1 Safe Format dialog box



TIP: You can rename SFORMAT to FORMAT, and the DOS FORMAT command to XXFORMAT, by selecting ALTERNATE NAMES... from the Norton Utilities main screen Configuration menu, and selecting Format for Safe Format. Then, whenever you type FORMAT at the DOS prompt, you automatically use Safe Format.

Set the following options in the Safe Format dialog box.

Drive: Select a drive for formatting. This list only shows floppy disk drives unless you specify hard disk formatting in the Configuration dialog box (see "Configuring Safe Format" later in this chapter).

Size: Select the floppy disk size. The default size is the drive's maximum capacity. You can format disks that are lower than your drive's capacity if your drive is capable of it.

Format Type: Select one of three format types:

- **Safe Format** uses its own formatting algorithm, checks the disk surface, marks bad sectors, creates Image files, and reformats bad tracks.
- **Quick Format** places a new system area on a previously formatted disk and creates Image files. Quick Format is faster than Safe Format and is good for quickly removing a large directory tree from a disk.
- **DOS Format** duplicates the DOS FORMAT command from DOS versions before 5.0. It completely erases all data; you cannot recover data that existed before formatting.

System Files: Specify whether or not to put system files on the disk to make it bootable, or to leave space for system files and make it bootable later.

From the Options group box, select any of the following three options:

- **Volume Label:** Enter a name of up to eleven characters for your disk.
- **Save Image Info:** Specify whether to save the disk's system area to the file IMAGE.DAT. If you accidentally format your disk, IMAGE.DAT enables UnFormat to

reconstruct the data. This option is not available for DOS Format mode.

- **Save Settings on Exit:** Check to keep all the current settings the same for next time.

Format: Select to begin formatting. A warning box displays any files currently on the disk. If you've mistakenly inserted the wrong disk, remove it before proceeding.

Configure: Select to open the Configuration dialog box where you can set drive options and save your settings. See the next section, "Configuring Safe Format," for a discussion of configuration options.

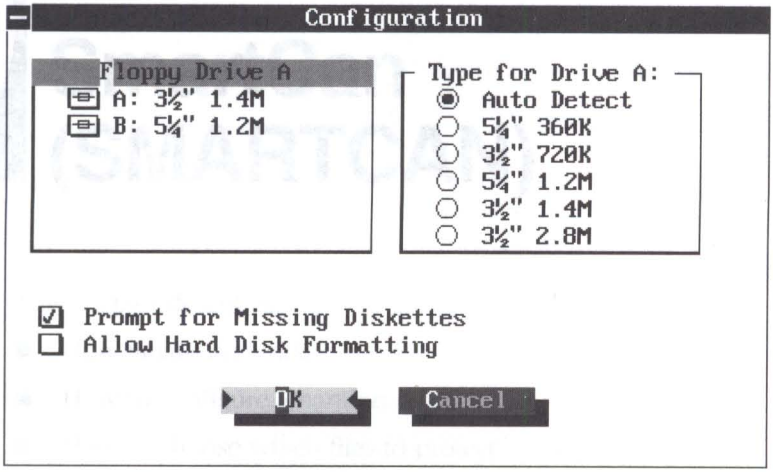
Exit: Select to quit Safe Format.

NOTE: Although the Size list shows lower capacity formats, some floppy disk drives may not be able to create them. Also, when you create a lower capacity floppy disk, it may not be readable on certain low capacity drives. For more information, see the drive's hardware manual.

Configuring Safe Format

Select the Configure command button in the Safe Format dialog box to change the Safe Format settings. The Configuration dialog box shown in Figure 29-2 appears.

Figure 29-2 Configuration dialog box



Set the following options in the Configuration dialog box.

Floppy Drive A (or B): Safe Format automatically determines the number, types, and highest capacities of the floppy drives attached to your computer. You should verify these settings. Changing the type in the Type for Drive A: (or B:) list alters the size list in the Safe Format dialog box. Do not change this list unless it is wrong.

Prompt for Missing Diskettes: Checking this check box may cause Safe Format to report no disk in the drive for certain laptop computers when you try a format. If this happens, make sure you have a disk in the drive, uncheck this check box, and run Safe Format again.

Allow Hard Disk Formatting: To protect against accidental hard disk formatting, Safe Format only shows floppy drives on the Drive list. You can select this option to override this default.

OK: Select to save your configuration settings and return to the Safe Format dialog box.

Cancel: Select to return to the Safe Format dialog box without saving your configuration settings.

CHAPTER

30 SmartCan (SMARTCAN)

This chapter describes:

- How SmartCan works
- How to configure SmartCan
- How to choose which files to protect
- The SmartCan defaults

What It Does

SmartCan (SMARTCAN) replaces and improves upon Erase Protect and TrashCan from previous versions of Norton Utilities. SmartCan is a memory-resident program that uses about 10K of RAM. It intercepts any command that deletes or erases files and stores the files' mapping information in a hidden directory called SMARTCAN to prevent the files from being overwritten. When you protect your deleted files with SmartCan, UnErase can recover them more reliably.

SmartCan automatically purges protected files after a specified number of days or kilobytes, allowing DOS to use the space.

NOTE: If you are on a network, the network administrator must create the \SMARTCAN directory and give rights to this directory for all users.

CAUTION: If you have a \SMARTCAN directory on a network, be aware that you have a potential security leak of confidential information. Because SmartCan preserves deleted files, anyone can access deleted information on networks that allow any user to undelete a file. On other networks, users cannot undelete

each other's files. However, simply by changing to the \SMARTCAN directory, any user can have full access to any of the stored files.

When to Use It

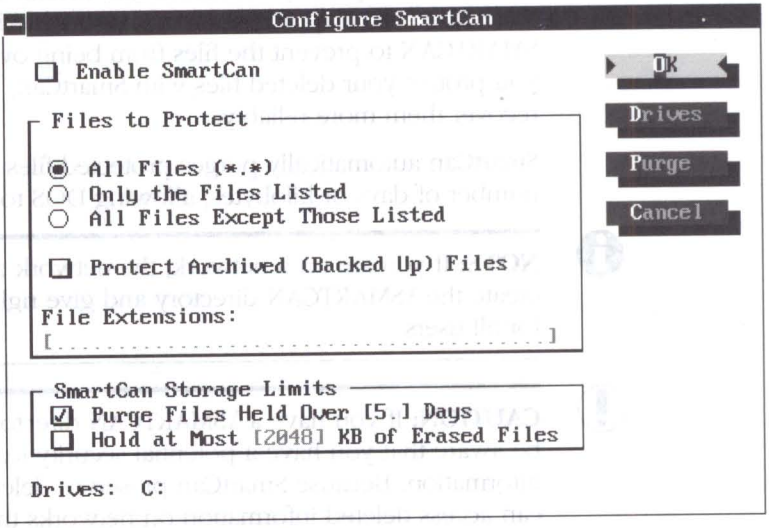
Start SmartCan every time you run your computer to preserve deleted files. This allows SmartCan to protect these files in the background in case you need to recover them later.

How to Use It

Load SmartCan and preserve deleted files from the moment you start your computer. Choose STARTUP PROGRAMS... from the Configuration menu on the Norton Utilities main screen and select Start SmartCan from the list box to place the command in your AUTOEXEC.BAT file.

To configure SmartCan in full-screen mode, choose SmartCan from the Norton Utilities main screen or type SMARTCAN at the DOS prompt. The Configure SmartCan dialog box shown in Figure 30-1 appears.

Figure 30-1 Configure SmartCan dialog box



You can also specify SmartCan settings from the command line. See Appendix C, "Command Line Reference," for information on using SmartCan from the command line.

NOTE: To recover deleted files that were protected with SmartCan, use UnErase.

Configuring SmartCan

The default configuration of SmartCan protects all files on the C: drive.

TIP: If disk space is at a premium, you may protect only certain types of files rather than all files. You can exclude those files with a .TMP, .SWP, or .INI extension because they are only temporary files that certain applications create and destroy during normal operation. You can also exclude files with an .EXE, .COM, or .SYS extension because you can restore them from their original program disks.

Enable SmartCan: Check this check box to enable SmartCan.

Files To Protect: Check the appropriate check box to specify which deleted files to protect.

- **All Files** protects every deleted file.
- **Only the Files Listed** protects only files with the extensions that you specify in the File Extensions text box.
- **All Files Except Those Listed** protects all files *except* those with the extensions that you specify in the File Extensions text box.
- **Protect Archived (Backed Up) Files** protects files that the DOS BACKUP command or Norton Backup have marked as backed up (archived). Files not backed up or those that have changed since the last backup have the archive attribute on. By default, SmartCan does not protect archived files because you can restore them from your backup disks.

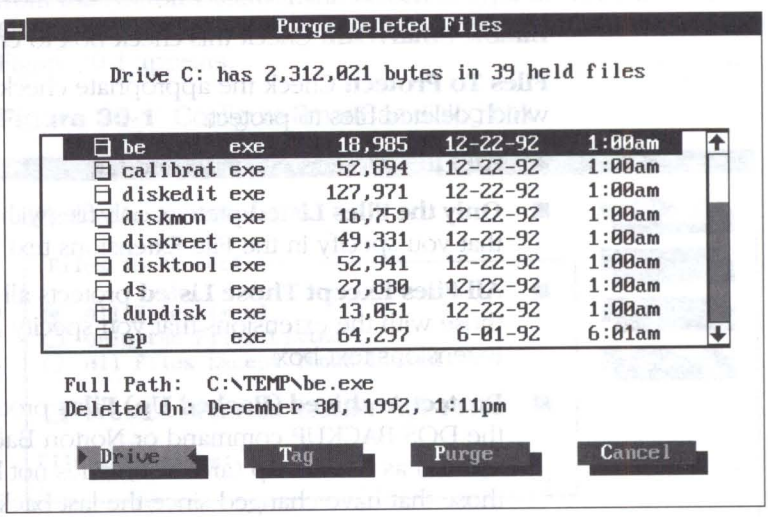
SmartCan Storage Limits: Check the check boxes or change the limits to set the storage criteria. By default, SmartCan purges files after five days or 2 MB, whichever comes first. SmartCan automatically purges with no warning beginning with the oldest files. However, if you run SmartCan, delete files, then disable SmartCan, these deleted files remain protected (unpurged) until you run SmartCan again.

Drives: Select the Drives command button to specify which drives to protect, including floppy drives and network drives.

NOTE: Any SmartCan options you set apply to all selected drives.

Purge: Select the Purge command button to display a list of files that SmartCan is currently protecting. You can purge these files manually from the Purge Deleted Files dialog box shown in Figure 30-2. Tag the files you want to purge by double-clicking files, selecting files with the Spacebar, or selecting the Tag command button; select Purge; then select Cancel.

Figure 30-2 Purge Deleted Files dialog box


Purge Deleted Files
Drive C: has 2,312,021 bytes in 39 held files
be exe 18,985 12-22-92 1:00am
calibrat exe 52,894 12-22-92 1:00am
diskedit exe 127,971 12-22-92 1:00am
diskmon exe 16,759 12-22-92 1:00am
diskreet exe 49,331 12-22-92 1:00am
disktool exe 52,941 12-22-92 1:00am
ds exe 27,830 12-22-92 1:00am
dupdisk exe 13,051 12-22-92 1:00am
ep exe 64,297 6-01-92 6:01am
Full Path: C:\TEMP\be.exe
Deleted On: December 30, 1992, 1:11pm
Drive
Tag
Purge
Cancel

CAUTION: On a network, the system administrator can manually purge files using the Purge Deleted Files dialog box. However, do not remain in the purge window any longer than required. While the purge window is open, SmartCan is inactive on the selected drive and does not protect files deleted by other network users.

CHAPTER

31 Speed Disk (SPEEDISK)

This chapter explains using Speed Disk to:

- Defragment files
- Optimize the physical layout of directories and files on a disk
- Generate disk statistics and file fragmentation reports

See "Optimizing Disks with Speed Disk" in Chapter 5, "Performance Tutorials," for the step-by-step procedures to defragment files and optimize a disk.

What It Does

Files are written to disk in units called *clusters*, usually 2K to 8K in size on a hard disk depending on the size of the disk, but larger on very large hard disks (over 512 MB). When you first create and save a file, DOS often finds enough contiguous, unused clusters to write the complete file. But, as you add to the file and save it repeatedly over time, the next contiguous clusters might be occupied by other files created in the meantime. A file becomes *fragmented* when DOS must split the original file across noncontiguous unused clusters. As you work with files—creating, modifying, copying, or deleting them—file fragmentation increases. Over time, your computer slows down because the disk drive's read-write head movement increases while DOS locates the pieces that make up the files.

Speed Disk (SPEEDISK) both defragments files, by placing all the pieces in the correct sequential order on contiguous clusters, and consolidates the unused data space on a disk. This allows your computer to read and write data much faster. Speed Disk

can also maximize performance by optimizing the physical placement of files and directories on the disk. The most often used files and directories are moved to the beginning of the disk where they are accessed fastest.

When to Use It

Use Speed Disk when you suspect that the time to read and write files is increasing, and when you frequently edit and save large files. You can also use Speed Disk to find out the extent of file fragmentation on a disk, and to create large blocks of unused disk space so that you can save a large file without fragmenting (such as a permanent Windows swap file).

TIP: Calibrate is another Norton Utilities program that improves hard disk performance. Calibrate performs a non-destructive, low-level format to refresh the magnetic sector markings of a disk and adjusts the interleave factor, if necessary. Use Speed Disk before or after you use Calibrate to put your hard disk into the most efficient state possible. See Chapter 7, "Calibrate (CALIBRAT)," for more information.

Before You Use Speed Disk

You need to be aware of two types of programs when working with Speed Disk: memory-resident programs (TSRs) and copy-protected programs.

CAUTION: It is impossible to verify beforehand that Speed Disk is compatible with every hardware and software combination. Before running Speed Disk on your machine for the first time, back up your entire hard disk. After you verify that Speed Disk is compatible with your machine, this precaution won't be necessary again.

Memory-Resident Programs

Because Speed Disk physically reorders the organization of your disk, you don't want anything to disturb the procedure before it

completes. Make sure you don't have any memory-resident programs active that might access the disk while Speed Disk is running. For example, never use Speed Disk when a fax/modem program is waiting for a call, and disable any scheduling TSRs and disk caches (such as Microsoft's SMARTDrive).

You don't have to worry about any Norton programs from Symantec; Speed Disk automatically manages them.

Copy-Protected Programs

Certain copy-protected programs put one or more files on your hard disk that must not be relocated. These programs note the disk location where the files were initially installed. If the files move, the copy-protection scheme assumes an illegal copy has been made and won't let the program run. Most of these protection techniques set the hidden and system attributes for their immovable files; a few use other methods.

Speed Disk takes special precautions to avoid disturbing such programs. Speed Disk examines each file on the disk separately to determine if it can be safely moved.

How to Use It

Choose Speed Disk from the Norton Utilities main screen, or type `SPEEDISK` at the DOS prompt. Select a drive to optimize. Network drives are not listed because, although you can run Speed Disk from a network drive, you cannot optimize a network drive. Speed Disk tests the selected disk for file fragmentation, displays a map showing the state of the disk, and recommends an optimization method, including "No optimization necessary" if appropriate.

When you select Optimize, Speed Disk performs the recommended optimization, updating the disk map as it works.

Speed Disk will also optimize compressed drives. Because Speed Disk must defragment compressed drives in two stages, the process can take some time.

WARNING: Don't turn off or otherwise disable your computer while Speed Disk is running. Turning off the power any time your computer is writing to the disk can damage files. Although Speed Disk has special protection to safeguard your computer in case of an accidental power loss, you should not tempt fate. You can safely interrupt Speed Disk before it finishes by pressing Esc.

To generate reports indicating the percent of a disk, directory, or file that is fragmented, select Cancel when Speed Disk makes its recommendation and then use the commands in the Information menu. These reports can help you decide how often to run Speed Disk.

With Speed Disk's ability to automatically recommend and perform the most appropriate method of optimization, you may never need to use the options available in the Speed Disk Optimize and Configure menus, which give you control over file and directory placement on the disk.

NOTE: You can also use Speed Disk from the command line or in batch files without running it in full-screen mode. Any options set when you last ran Speed Disk interactively are automatically used as the defaults, although command-line switches take precedence over the default settings. See Appendix C, "Command Line Reference," for more information.

Customizing Speed Disk

Speed Disk can perform a number of different optimizations as it rearranges a disk. You can choose to defragment only files or defragment only the free space. With other options, you can fine tune the placement of directories and files for maximum performance. For example, you can place all directories at the beginning of the disk to speed up access time, as a directory must always be accessed before a file. You can place directories specified in your PATH statement, which DOS searches first for programs, before all other directories. Additionally, you can place executable files before all other files since these are read frequently, but not written to.

You fine tune the way Speed Disk optimizes your disk by using both the Optimize and Configure menus. You can specify the following:

- Method of optimization
- Placement of directories and files
- Files that should not be moved (such as system files and copy-protected files)

Remember, however, that these choices affect how long Speed Disk takes to run.

If you change the settings and intend to reuse them for future optimizations, choose SAVE OPTIONS TO DISK from the Configure menu. Speed Disk will use the settings the next time you run it.

Choosing an Optimization Method

To choose a specific optimization method, select the option button for the desired method from the Speed Disk Recommendation dialog box if you've just started the program. Alternatively, choose OPTIMIZATION METHOD... from the Optimize menu and select one of the five optimization methods.

Full Optimization: The fastest method to optimize a disk and defragment files. Speed Disk first moves directories, and then files, in the order that they physically occur on the disk. The order of files after optimization is independent of the directory structure of the drive.

Full with Directories First: Offers the best gains in performance, but takes longer to run. This method uses the "Directory Order" and "Files to Place First" information specified in the Speed Disk Configure menu while defragmenting files. Speed Disk first moves the specified directories to the beginning of the disk, then the remaining directories. Next, Speed Disk moves the specified files to the beginning of the disk, then the remaining files.

Full with File Reorder: The most complete method of optimization, which takes the most time to run. Speed Disk uses the "Directory Order" and "Files to Place First" information specified in the Speed Disk Configure menu while defragmenting files. Speed Disk moves the remaining files based on their logical (directory) order, rather than on their physical location

on the disk. The only real advantage this method has over the first two methods is that files associated with directories placed first are also placed closer to the beginning of the disk.

Unfragment Files Only: Attempts to defragment as many files as possible, but does not consolidate the unused data space. Some large files may not be defragmented at all. A good housekeeping practice is to run Speed Disk once or twice a week with the Unfragment Files Only method.

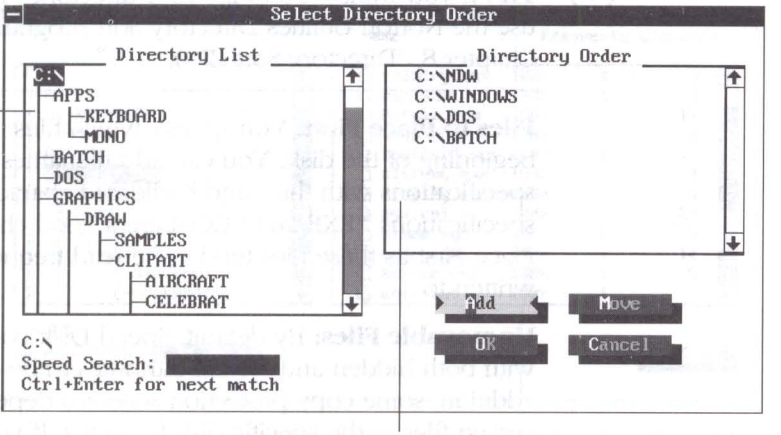
Unfragment Free Space: Moves data forward on the disk to fill in the free space, but does not defragment files. This is quick, but may not result in significant speed improvements. Use this method if you want new files written at the end of the disk where they will not be fragmented.

Configuring Optimization

Use the Speed Disk Configure menu commands to control the specific placement of files and directories to maximize performance. These options have the greatest impact on older computers with slow hard disks. The configuration you set applies during the optimization, depending on which optimization method you select.

Directory Order: You specify which directories to place first when Speed Disk moves directories to the beginning of the disk during the optimization, as illustrated in Figure 31-1. The default order is the same as the DOS path, usually specified in your AUTOEXEC.BAT file.

Figure 31-1 Select Directory Order dialog box



Add your most frequently accessed directories to this list

Directories in this list box are moved to the front of the disk during optimization

To add a directory to the Directory Order list box, select Directory List and highlight the directory to add to the Directory Order. Then select Add. The selected directory from the Directory List is added immediately above the most recently selected directory in the Directory Order list box.

To delete a directory from the Directory Order list box, highlight a directory in the Directory Order list box, then select Delete. Don't worry, you're not actually deleting a directory, just removing it from a list.

To move a directory within the Directory Order list box, highlight the directory to move from the Directory Order list box, then select Move. Two arrowheads at the ends of the highlight indicate the selected directory. Position the selected directory in the list with the UpArrow and DownArrow keys, then press Enter to "drop" the directory at the desired location.

File Sort: You specify the sort order for files within directories. The default is "unsorted," which is the order in which DOS displays directory listings. You can sort files by name, extension, date and time, or size—in ascending or descending order. If you are using NDOS, you won't see the change because NDOS sorts the file listing itself.

TIP: If you want DOS to list your directories in a specific order, use the Norton Utilities Directory Sort program, as described in Chapter 8, "Directory Sort (DS)."

Files to Place First: You specify which files to move to the beginning of the disk. You can add filenames or file specifications with the * and ? wildcard characters. The file specifications *.EXE and *.COM are a good choice for Files to Place First as these files tend to be read frequently, but not written to.

Unmovable Files: By default, Speed Disk considers all files with both hidden and system attributes to be unmovable. In addition, some copy-protection schemes depend on finding certain files in the specific disk locations. If you have such files, you can add up to ten filenames or file specifications with the * and ? wildcard characters to the files that Speed Disk automatically determines should not be moved.

To add files to the Unmovable Files list, type the file specification in the text entry box. Press DownArrow to get another text entry box. To delete files from the Unmovable Files list, highlight the file specification then select Delete.

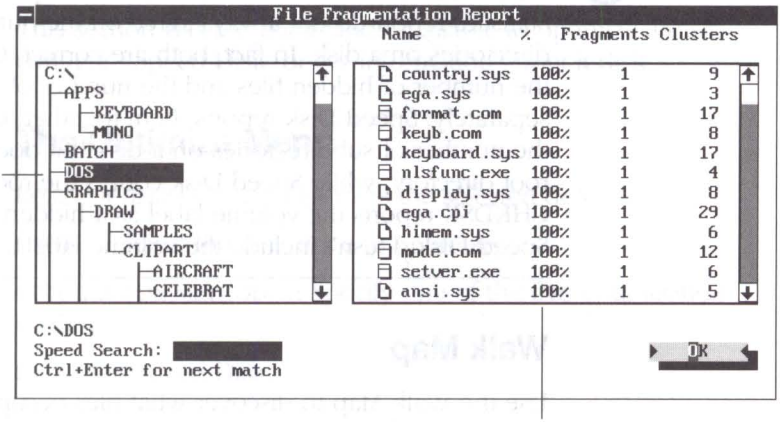
Getting Information

Each time you run Speed Disk, it reports the percentage of the disk that contains unfragmented files and recommends an optimization method, if appropriate. Sometimes, however, you may want to see which files are badly fragmented and decide to optimize your disk or not, based on that information. Speed Disk includes three tools to show the state of your disks: the fragmentation report, disk statistics, and the Walk Map.

Fragmentation Report

To generate a fragmentation report as illustrated in Figure 31-2, select Cancel in the Speed Disk Recommendation dialog box, then choose FRAGMENTATION REPORT... from the Information menu.

Figure 31-2 File Fragmentation Report



Select the directory of interest

100% indicates a completely unfragmented file

As you scroll through the directory tree in the left panel, the number of fragments, the number of clusters occupied, and the fragmentation level of each file appears in the right panel. 100% indicates a completely unfragmented file. The display emphasizes moderately fragmented files (90% or more unfragmented) or highly fragmented files (89% or less unfragmented).

Subdirectories are listed as files in their parent directories, since a subdirectory is a particular kind of DOS file.

Disk Statistics

The Information menu's DISK STATISTICS... command provides other information about the selected drive, including the percentage of the disk used, the number of files, and the number of clusters allocated to unmovable files.

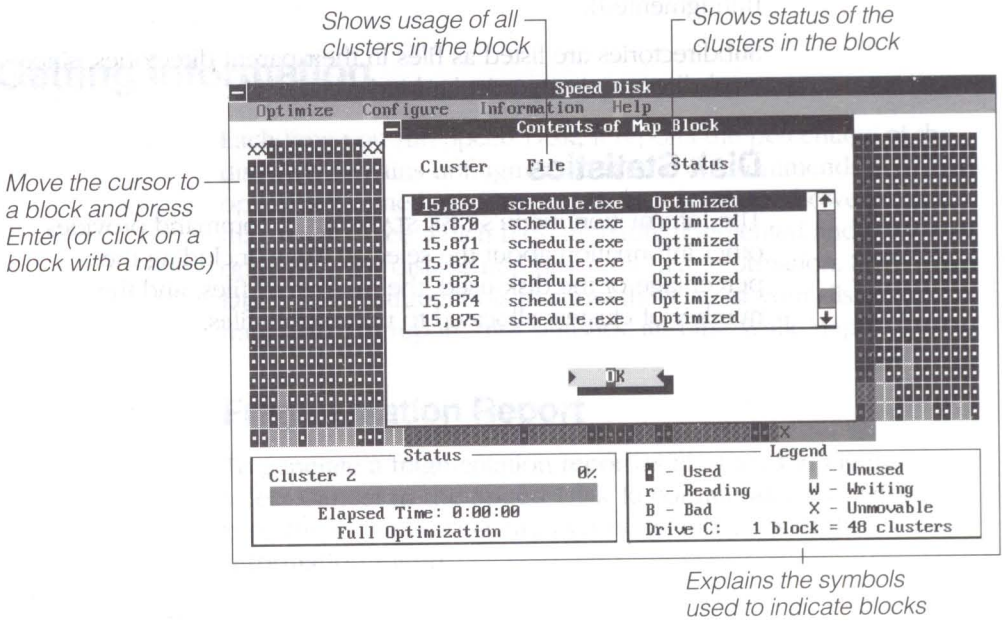
NOTE: The DOS CHKDSK report and the Speed Disk Disk Statistics report do not always agree on the number of files and directories on a disk. In fact, both are correct. CHKDSK reports the number of hidden files and the number of user files separately; Speed Disk reports them together. CHKDSK reports the number of subdirectories on a disk but does not count the root directory, while Speed Disk counts the root as a directory. CHKDSK reports the volume label as a hidden file of 0 length. Speed Disk doesn't include the volume label as a file.

Walk Map

Use the Walk Map to discover what files occupy any block on the disk. A block represents a number of clusters on your disk; the block-to-cluster ratio varies depending upon the size of your disk and your screen resolution.

To get information about a specific block, choose WALK MAP from the Information menu. Figure 31-3 shows how to navigate the Walk Map.

Figure 31-3 The Speed Disk Walk Map



Speed Disk Menu Commands

This section lists the commands available to optimize a disk, configure Speed Disk, or get information about a disk.

The Optimize Menu

BEGIN OPTIMIZATION...: Optimize the selected disk.

DRIVE...: Select the disk drive to optimize.

OPTIMIZATION METHOD...: Specify one of the five optimization methods.

EXIT: Quit Speed Disk.

The Configure Menu

DIRECTORY ORDER...: Specify the order in which Speed Disk moves directories to the beginning of the disk.

FILE SORT...: Specify the order of files within directories.

FILES TO PLACE FIRST...: Specify which files Speed Disk moves to the beginning of the disk.

UNMOVABLE FILES...: Identify which files Speed Disk should not relocate.

OTHER OPTIONS...: Control Speed Disk behavior. Read-After-Write verifies that data has been written correctly. Clear Unused Space wipes (writes zeros in) all unused clusters of the disk for greater data security. Beep When Done beeps when the optimization completes.

SAVE OPTIONS TO DISK: Save configuration changes for the next optimization.

The Information Menu

DISK STATISTICS...: Find out disk usage and file fragmentation.

MAP LEGEND...: Learn symbols used on the disk map.

SHOW STATIC FILES...: List files that Speed Disk has determined should not be moved.

WALK MAP: Find out which files occupy any of the clusters shown in the disk map.

FRAGMENTATION REPORT...: Find out which files are fragmented.

CHAPTER

32 System Information (SYSINFO)

This chapter describes how System Information:

- Reports your computer's configuration, hardware and software characteristics, memory use, and performance
- Can maintain a history of your computer's configuration
- Can print every report, including listings of your .INI files

What It Does

System Information (SYSINFO) reports the operational status of your computer: hardware, memory use, network conditions, available disk drives, and benchmark comparisons to other computers. System Information displays the system's performance rating and generates a graphic report of its findings.

NOTE: System Information recognizes and reports on all the standard IBM PCs and compatibles. It also recognizes specialty models of the PC family, such as the 3270-PC. If System Information doesn't recognize your computer, it will attempt to find and show you identifying marks, such as a copyright notice and your computer's ROM BIOS date.

When to Use It

Use System Information to see your memory overhead (the difference between total memory and the amount of memory available to your programs), resolve terminate-and-stay-resident (TSR) program and device driver conflicts, and provide detailed system information for technical support calls or reports. You

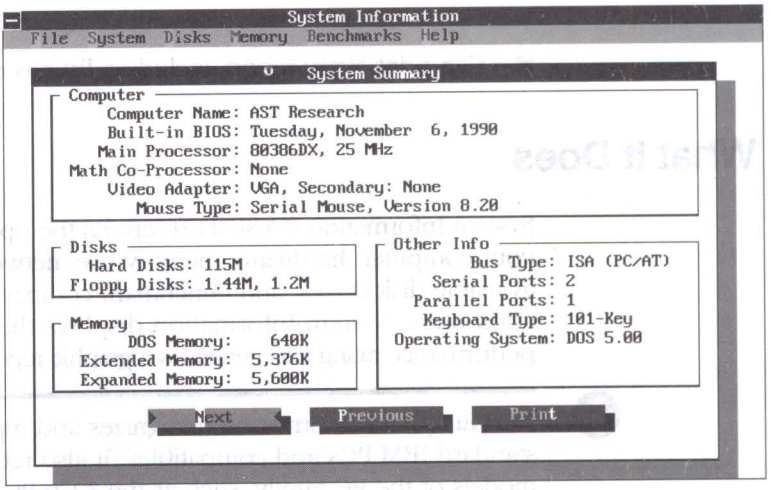
can also use it to obtain a report of a disk's configuration and check its performance.

System Information also reports on the status of your system configuration for troubleshooting when you install boards, ports, or adapters, and for more general troubleshooting needs.

How to Use It

Choose System Info from the Norton Utilities main screen or type SYSINFO at the DOS prompt. The System Information screen in Figure 32-1 appears.

Figure 32-1 System Information screen



You can also specify System Information report screens to view, skip, or print directly from the DOS prompt. See Appendix C, "Command Line Reference," for more information.

The following three command buttons appear on almost every System Information report screen. Using these buttons, you can cycle through all screens or go back sequentially to previous screens.

Next: Go to the next screen.

Previous: Go back to the previous screen.

Print: Print the current screen or save it to a file.

System Information Menu Commands

This section lists the pull-down menu commands available to view information about your system, disks, memory, and benchmark comparisons, and to generate reports on any of these topics.

The File Menu

VIEW CONFIG.SYS...: Display the CONFIG.SYS file on the screen. The CONFIG.SYS file defines the device drivers and other settings that DOS loads at startup time.

VIEW AUTOEXEC.BAT...: Display the AUTOEXEC.BAT file on the screen.

VIEW FILES.INI...: Display available initialization files, including NDOS.INI and, if you run Microsoft Windows, WIN.INI and SYSTEM.INI.

PRINT REPORT...: Generate a report including any of the System Information data that you select from the scrollable list. The default report selection uses all applicable data. You can send this report to a printer or file. The Report dialog box includes the following options:

- **OK:** Start the report generation with the current settings. System Information prompts you for a report title.
- **Cancel:** Exit the Report dialog box without generating a report.
- **Load:** Generate a report file that you previously made, composed of your preselected settings.
- **Save:** Save your current report settings to a file for future use.

EXIT: Quit System Information.

The System Menu

SYSTEM SUMMARY...: View a complete survey of your computer, including:

- The type of computer you have.

- The number and capacity of disk drives on your computer.
- The memory capacity on your computer.
- Other information, including bus type, serial and parallel ports, keyboard type, and operating system. On Compaq computers, System Information displays CPU speed setting and memory cache status.

VIDEO SUMMARY...: Report the type of video display, character size (width and height of characters in pixels), and video memory capacity.

HARDWARE INTERRUPTS...: Display the interrupt address, use, and the program that uses the interrupt.

SOFTWARE INTERRUPTS...: Display each interrupt address, use, and the program using it.

NETWORK INFORMATION...: Report user and network information, if applicable (Novell NetWare networks only).

CMOS STATUS...: Display the equipment configuration stored in the Complementary Metal Oxide Semiconductor (CMOS). Incorrect values appear in red or boldface. To correct errors, run the CMOS setup program or start your computer from the Diagnostic Disk that came with it. If you don't know how to access your CMOS setup, consult your computer manual or manufacturer. The manufacturer can also tell you the correct CMOS settings. If you continue to have CMOS problems, you may need to replace the battery.

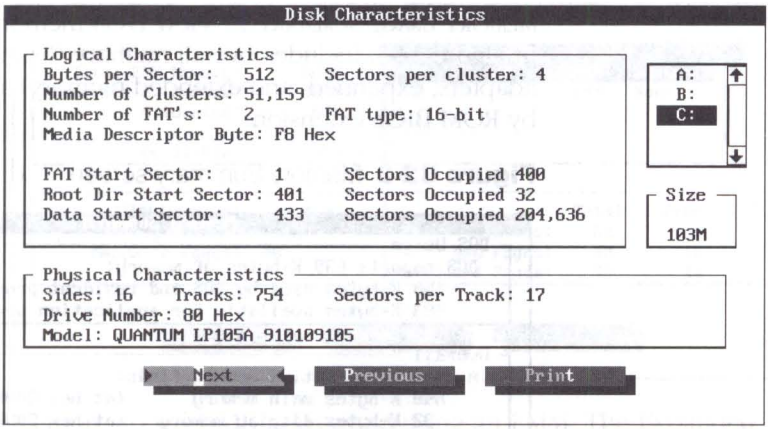
The computer uses the CMOS Checksum to determine if any values in the CMOS have changed outside its setup program. If the Checksum status is not correct, run the setup program regardless of the other values.

The Disks Menu

DISK SUMMARY...: Report disk drive use. When a drive is labeled Available, that drive is usable with the DOS SUBST command or the Novell MAP network command.

DISK CHARACTERISTICS...: Report disk statistics, as shown in Figure 32-2.

Figure 32-2 Disk Characteristics screen



The size of the disk partition determines the disk's Logical Characteristics. The Bytes per Sector and the Sectors per Cluster determine the least space a file on the disk requires (the size of the allocation unit is one cluster). These facts determine the number of clusters for your disk. The Number of Clusters affects the FAT size: disks with more than 4085 clusters need 16-bit FATs, while those with fewer clusters use 12-bit FATs to save space. There are usually two copies of the FAT.

The Media Descriptor Byte tells DOS the disk type. The rest of the Logical Characteristics, the root directory and data starting sectors of the FAT and the sectors they occupy, describe the disk organization and overhead (data management) allocation.

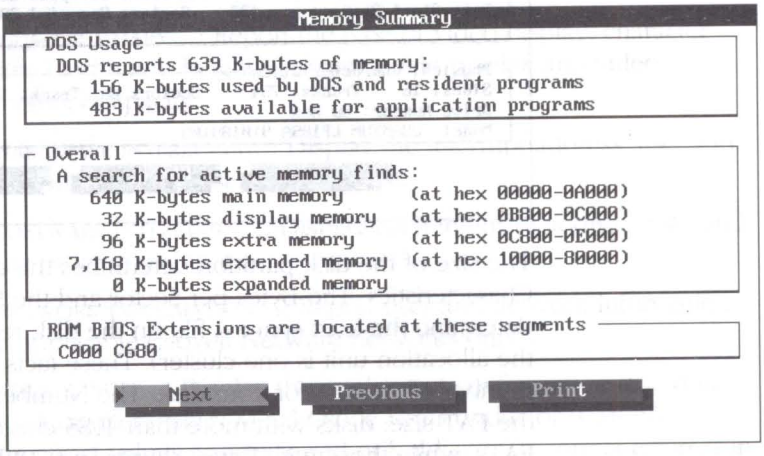
Physical Characteristics tell you the reported physical specifications of the drive: the number of heads, tracks, and sectors per track. On some systems, especially those with an ESDI, IDE, SCSI, or RLL interface, the values reported may be different from the drive, because the disk controller converts them to make the drive look like one the computer knows how to use.

PARTITION TABLES...: Display your hard disks' partition tables, including the System (type of partition) of each, if it's the startup drive, and the size and location of the partitions. Unused space is not reported.

The Memory Menu

MEMORY USAGE SUMMARY...: View DOS memory usage, as shown in Figure 32-3. Includes overall memory (from screen display adapters, expanded, and extended memory) and memory used by ROM BIOS extensions.

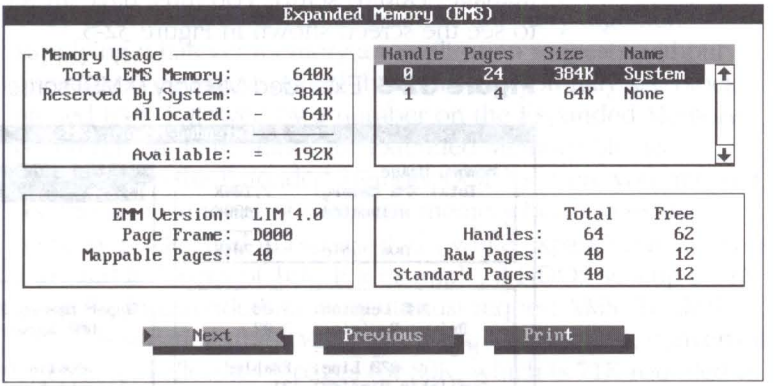
Figure 32-3 Memory Summary screen


Memory Summary
DOS Usage
DOS reports 639 K-bytes of memory:
156 K-bytes used by DOS and resident programs
483 K-bytes available for application programs
Overall
A search for active memory finds:
640 K-bytes main memory (at hex 00000-0A000)
32 K-bytes display memory (at hex 0B800-0C000)
96 K-bytes extra memory (at hex 0C800-0E000)
7,168 K-bytes extended memory (at hex 10000-80000)
0 K-bytes expanded memory
ROM BIOS Extensions are located at these segments
C000 C680
Next
Previous
Print

NOTE: The memory shown for the display may be less than that for Video Memory on the Video Summary screen, because the video memory is paged in and out of the display memory window. If your video card has more than 256K of video memory, System Information reports it as 256K of memory "or more," instead of displaying the full amount. This 256K limit comes from the IBM standard check for video card memory, which uses a video BIOS call. To remain compatible with IBM, cards from other manufacturers report 256K of memory even if they have more.

EXPANDED MEMORY (EMS)...: View your current Expanded Memory Manager (EMM) setup. You must have an EMM installed to see the screen shown in Figure 32-4.

Figure 32-4 Expanded Memory (EMS) screen



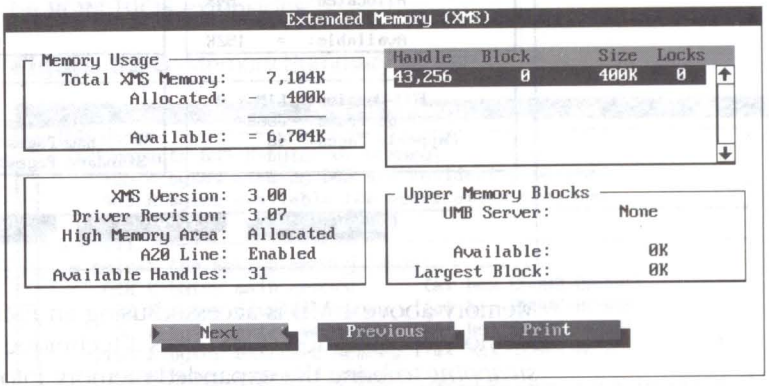
Memory above 1 MB is accessed using an EMM. The Expanded Memory Specification (EMS) uses a technique called *page swapping* to bring the expanded memory into an area below the 1 MB address space that can be accessed by the system. This technique creates a 64K region, called a *page frame*, in the high DOS memory area. When DOS or a program needs to update information in expanded memory, the information must first be read from expanded memory, placed (or swapped) into the page frame, updated, then placed back in expanded memory. Expanded memory was originally designed for IBM PC XT computers which could not access memory above the 1 MB address.

When an application allocates an expanded memory block, the application receives a *handle* to the block from the EMM. System Information finds these handles and displays information on their memory blocks. This includes the number of expanded memory pages owned by the handle.

If the EMM follows the Lotus-Intel-Microsoft (LIM) version 4.0 specification of EMS, handles are associated with names that describe the block, or identify the block's owner. System Information displays the names of the handles that have names. It also displays information on the expanded memory pages, both standard and raw pages. Standard pages are 16K and raw pages can be a multiple of 16K. If your system does not support raw pages, the raw pages equal the standard pages.

EXTENDED MEMORY (XMS)...: View your current Extended Memory Manager (XMM) setup. You must have an XMS driver installed to see the screen shown in Figure 32-5.

Figure 32-5 Extended Memory (XMS) screen



Memory from 1 MB to a theoretical limit of 4 gigabytes is accessed using an XMM. The XMM allocates Extended Memory Specification (XMS) memory to applications. Although some programs can access extended memory directly, an XMM such as DOS HIMEM.SYS prevents them from overlapping. Extended memory was introduced with the 80286 PC AT class computers.

Allocating a block of extended memory is similar to allocating a block of expanded memory. The application receives a handle to the block from the XMM. System Information locates and displays this handle. Applications can *lock* an extended memory block to prevent another program from overwriting data that is in use, and System Information displays the *lock count* for each handle (a zero value means the block is unlocked). You probably won't see any locks unless you are running a multitasking environment such as Windows or DESQView.

System Information also displays information on your Upper Memory Blocks (UMBs). UMBs are primarily supported on 386 and higher computers, and 386 memory managers such as EMM386 manage them. The UMB Server on the Extended Memory (XMS) screen indicates whether DOS or the XMM is handling the UMBs. If your computer does not support UMBs, the UMB server is set to None.

NOTE: Some memory managers are both EMS and XMS drivers. They can mix extended and expanded memory together, supplying whatever memory an application requests without question. If you have one of these drivers, you may see blocks named EMB followed by a number on the Expanded Memory (EMS) screen. EMB stands for Extended Memory Blocks. However, on the Extended Memory (XMS) screen, you may not see the same amount of extended memory because extended memory is allocated in blocks of 1K, while expanded memory is allocated in blocks of 16K. For example, if NDOS sets up a 71K swap file in extended memory, it must request XMS. To deal with this situation, the EMM accepts the XMS request, converts it to EMS, and allocates 5 pages (or 80K, which is 71K rounded to the nearest multiple of 16K). This illustrates how a combined XMS/EMS driver offers more versatility.

MEMORY BLOCK LIST...: View DOS memory block use, including the size of blocks in bytes, the owner or program, and the type (data, program, or environment). Use for finding holes in memory and using memory more efficiently.

TSR PROGRAMS...: View the size, owner, and hooked interrupt-vectors of TSR programs. As you highlight a TSR, you see the location of the program, the command line that loaded it, and its number of allocation blocks. Because some TSRs strip this information out to save memory, it may not show for all TSRs. Due to DOS constraints, the last TSR to grab a particular interrupt is the only one with that interrupt listed as hooked. The other TSRs are dependent upon this one to pass them the interrupt if they need it. This dependency is why you can only unload the most recently loaded TSR.

DEVICE DRIVERS...: View installed device drivers, including their addresses, ID names (an 8-byte signature in the device driver such as CON or PRN), and descriptions. Not all device drivers have a recognizable ID name.

The Benchmarks Menu

CPU SPEED...: Rate your computer's performance index. A visual graph shows how your CPU benchmarks against other popular computers. The visual graph is constantly retesting the CPU; therefore, mouse movement will decrease the speed.

HARD DISK SPEED...: A visual graph shows how your hard disk benchmarks against other popular computers.

OVERALL PERFORMANCE INDEX...: Display the Performance Index, which combines the CPU and Disk Speed indexes to give you a single number for system comparisons.

NETWORK PERFORMANCE SPEED...: Measure throughput for reads and writes on a network. You must have read and write rights to a network drive for this test.

CHAPTER

33 Text Search (TS)

This chapter describes how to use Text Search to:

- Search for files when other means have failed
- Recover at least part of a deleted file
- Search specific parts of your disk for a missing file

What It Does

Text Search (TS) is a command-line utility that searches for specific text in one or more files or anywhere on the disk, including the erased space. You can use Text Search on network drives.

Once you find the name of a file with Text Search, you can use UnErase to recover all or part of the file.

When to Use It

Use Text Search whenever you are unable to locate a file by name, but you can recall a word or phrase it contains. The file can be an erased file. For erased files, Text Search can locate at least that part of the file, if it still exists, that contains the text.

How to Use It

Choose Text Search from the Norton Utilities main screen or type `TS` at the DOS prompt. Text Search requires one of the following syntaxes:

```
TS [pathname] [search-text] [/A] [/CS] [/EBCDIC] [/LOG
[> filename | PRN]] [/S] [/T] [/WS]
```

```
TS [drive:] [search-text] /D | /E [/A] [/Cn] [/CS] [/EBCDIC]
   [/LOG [> filename | PRN]] [/WS] [/F:pathname]
```

If you just type `TS` at the DOS prompt, Text Search prompts you to specify the type of search and what to search for. If you omit the pathname, you must also omit the search text or Text Search assumes that the search text is the pathname. Your file specification can include the DOS wildcard characters ? and *.

When performing a search for two or more words, enclose the search text in double quotation marks. For example, `"This is a test"` is valid search text.

Text Search normally operates interactively. Each time it finds an instance of the search text it pauses, displays several lines of surrounding text in the file, and asks if it should search for more. This interaction allows you to terminate the search as soon as you've found what you're looking for.

The Text Search command-line switches are described in the next section.

Command-Line Switches

pathname	The drive, directory name, and filename of the file or files to search for.
drive:	The drive letter of the drive to search.
search-text	The string of text to search for.
/A	Automates the search process by always answering "yes" each time Text Search prompts you to continue searching. Use this switch to determine the number of occurrences of a text string within a large file.
/Cn	Begin the search at cluster *n*.
/CS	Perform a case-sensitive search for the string.
/D	Search for all occurrences of the string throughout the disk. Use this switch only after trying other searches, because Text Search examines every cluster on your

disk including used and unused clusters. This search takes longer than the others and displays cluster numbers with surrounding text. When using this switch, do not specify a search path because a search of the entire disk includes every possible path. Also, if you redirect the results to a file, it must be on another disk. This switch does not work on assigned, network, or substitute drives.

/E — Search for all occurrences of the string throughout the disk's erased and unused space. Search times vary according to how much unused space your disk contains. Do not specify a search path. Also, if you redirect the results to a file, it must be on another disk. This switch does not work on assigned, network, or substitute drives.

/EBCDIC — Convert the search string from ASCII to EBCDIC, then search for the EBCDIC string.

/F:pathname — Store each cluster containing an occurrence of the search text to a file on another disk. Use this switch to bypass all interactive dialog with Text Search when searching entire drives.

/LOG[> filename | PRN] — Format the search results to a log file for subsequent viewing or printing. The greater-than symbol (>) redirects output into the subsequent filename or, if you use PRN, your printer. If you don't specify an output file, Text Search asks for one before it begins. This switch automates the search by having Text Search look for all possible matches and sending them to the output without showing you the progress.

/S — Search all subdirectories of the specified directory.

/T	Set to non-interactive mode and output only filenames that contain the search string and the total number of files found.
/WS	Exclude from the search those characters in the IBM PC extended character set (those defined with eight bits instead of just seven). Wordstar and other applications use the eighth bit for special purposes.

Examples

To run Text Search and enter all search details when prompted, type:

```
TS
```

To search all .DOC files on the disk for the word "somewhere," start the search at the root directory and type:

```
TS \*.doc somewhere /S
```

To search every cluster on the disk for the words "somewhere out there," including erased data space and all files, type:

```
TS "somewhere out there" /D
```

To create a file that lists all the files with a .DOC extension in the current directory in which the word "somewhere" occurs, type:

```
TS *.doc somewhere /T /LOG > list.log
```

The /T switch lists just those filenames in which it finds the search text, omitting the surrounding text. This search limits itself to files in the current directory. The /LOG switch formats the output for a log file. Finally, the greater-than symbol (>) redirects the report to a file called LIST.LOG in the current directory.

CHAPTER

34 UnErase (UNERASE)

This chapter describes:

- Using UnErase to recover deleted files
- Using the UnErase menu options

What It Does

UnErase searches for and recovers deleted files. Using UnErase, you have two methods of recovery:

- Use UnErase to automatically recover deleted files that have remained intact.
- Use Manual UnErase to recover deleted files that are fragmented or overwritten and you could not recover automatically.

When to Use It

Use UnErase to recover files that you accidentally deleted. Use Manual UnErase to recover fragmented or partially overwritten deleted files.

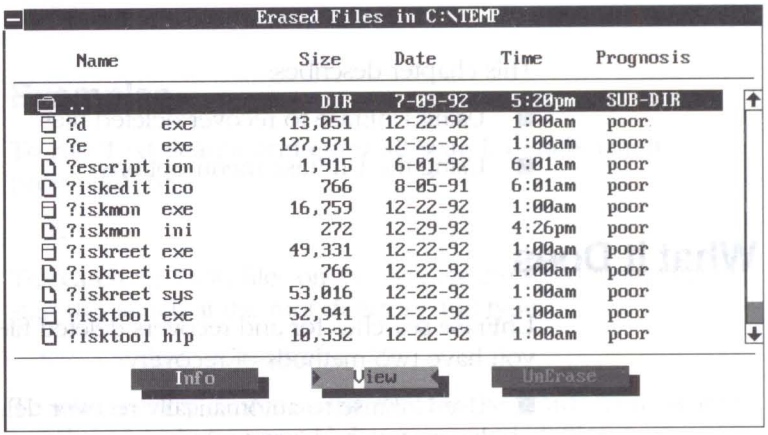
How to Use It

Choose UnErase from the Norton Utilities main screen or type `UNERASE` at the DOS prompt. For more information on using UnErase from the DOS prompt, see Appendix C, "Command Line Reference."

UnErase checks your disk for files protected with SmartCan or Erase Protect. If you have used both these utilities, a dialog box asks whether you want to recover files protected by SmartCan or Erase Protect. Select the utility you used to protect the file you want to recover.

The UnErase dialog box in Figure 34-1 appears.

Figure 34-1 UnErase dialog box


Erased Files in C:\TEMP
Name
Size
Date
Time
Prognosis
.. DIR 7-09-92 5:20pm SUB-DIR
?d exe 13,051 12-22-92 1:00am poor
?e exe 127,971 12-22-92 1:00am poor
?escript ion 1,915 6-01-92 6:01am poor
?iskedit ico 766 8-05-91 6:01am poor
?iskmon exe 16,759 12-22-92 1:00am poor
?iskmon ini 272 12-29-92 4:26pm poor
?iskreet exe 49,331 12-22-92 1:00am poor
?iskreet ico 766 12-22-92 1:00am poor
?iskreet sys 53,016 12-22-92 1:00am poor
?isktool exe 52,941 12-22-92 1:00am poor
?isktool hlp 10,332 12-22-92 1:00am poor
Info
View
UnErase

On the UnErase dialog box, use the command buttons below the erased files list to view file contents and important recovery information.

Info: Displays the time and date of modification, size, attributes, prognosis, starting cluster number, and number of clusters needed for the selected file. Select Next to see information on the next erased file. Select Previous to see the previous file.

View: Displays the selected file. If the file has been partially overwritten, a message informs you of the situation. If you view a subdirectory or the parent directory (indicated by two periods), View changes the current directory. While viewing a file:

- Select Next to view the next erased file.
- Select Previous to return to the last file viewed, unless you're viewing the first file.
- Select Text/Hex to toggle the display format between text and hexadecimal. Hex view shows numeric byte values on the left side of the screen and the equivalent text on the right.

- Select OK to return to the main screen.

UnErase: Recovers the selected file.

Connections with Other Utilities

UnErase uses information saved by Image or the DOS Mirror program. Like Image, Mirror saves a copy of the bookkeeping information for the disk. UnErase checks for Image and Mirror data, and if both are found, uses the most recent information. To update the Image information each time you start your computer, include the IMAGE command in your AUTOEXEC.BAT file.

If you use both Image and Mirror and want to use the Image data to help recover files, enter `UNERASE /image` on the command line. To use the Mirror data to help recover files, type `UNERASE /mirror` on the command line.

Use SmartCan to prevent overwriting of deleted files. UnErase can recover files protected with SmartCan with 100-percent reliability. Use UnErase in combination with SmartCan to recover files over a network. UnErase can also recover files protected with the Erase Protect utility included in earlier versions of Norton Utilities, or with Delete Sentry.

DOS provides deletion tracking and delete sentry programs that provide functions similar to SmartCan. Unlike SmartCan, deletion tracking cannot guarantee 100-percent recovery because it does not protect from overwriting or remove obsolete entries from its data file. Also, deletion tracking doesn't work on a network.

UnErase automatically accesses deletion tracking and delete sentry information if it exists. To disregard deletion tracking information, type `UNERASE /notrack` on the command line.

UnErase Menu Commands

This section describes your pull-down menu options when working with UnErase. For step-by-step instructions on using UnErase, see Chapter 3, "Recovery Tutorials."

Table 34-1 summarizes some of the UnErase menu commands you should use if you have trouble finding a file or its directory.

Table 34-1 UnErase menu command summary

Situation	Menu	Command
You know the filename and the directory from which it was erased.	File	CHANGE DIRECTORY...
You know the filename, but the file's directory was also deleted.		
■ To recover several files from the directory.		Recover the directory
■ To recover one file when you can't recover the directory or you don't know the directory.	Search	FOR LOST NAMES
You don't know the filename or the file was overwritten.	File Search	VIEW ALL DIRECTORIES FOR LOST NAMES
You don't know the filename, but you know the file contents.	Search Search	FOR DATA TYPES... FOR TEXT...
You were unsuccessful using UnErase, text search, and data search.	File	MANUAL UNERASE...

The File Menu

VIEW CURRENT DIRECTORY: Displays deleted files in the current directory, including subdirectories.

VIEW ALL DIRECTORIES: Shows all deleted files on the currently selected drive.

CHANGE DRIVE...: Brings up a dialog box for selecting another drive.

CHANGE DIRECTORY...: Brings up a dialog box for selecting another directory. Type a directory name or use the arrow keys to select a directory.

SELECT: Tags the selected file with an arrow. Tagged files are recovered when you select the UnErase button.

SELECT GROUP...: Brings up a dialog box where you can type a file specification. Include the DOS wildcards * and ? to select a group of files. Select OK to tag all files matching the specification.

UNSELECT GROUP...: Brings up a dialog box in which you type a file specification. Include the DOS wildcards * and ? to deselect a group of files. Select OK to untag all tagged files that match the file specification.

RENAME...: Allows you to enter a new name for the recovered directory or file.

UNERASE TO...: Brings up a dialog box for selecting another drive to which to recover a file.

APPEND TO...: Allows you to use Manual UnErase to add clusters to a recovered file.

MANUAL UNERASE...: Starts Manual UnErase for recovering fragmented or partially overwritten files. You can recover files with a poor prognosis for recovery and reorder clusters of files.

CREATE FILE...: Creates a new file with a specified name. With this option, you enter a file name and use Manual UnErase to add individual clusters to the file. Use when the files data is intact but its directory entry has been overwritten.

EXIT: Quits UnErase.

The Search Menu

FOR DATA TYPES...: Scans the deleted data for your choice of normal text, Lotus 1-2-3, Symphony, or dBASE data. Check Other Data to search for all other data types.

FOR TEXT...: Scans the deleted data for the text string you supply. Check Ignore Case for a case-insensitive search.

FOR LOST NAMES: Searches for names of deleted files in deleted directories.

SET SEARCH RANGE...: Specifies a cluster range to search. Use this option before searching for data types, text, or lost names to limit the search.

CONTINUE SEARCH...: Resumes an interrupted search, so you don't have to start over.

The Options Menu

SORT BY NAME: Sorts the list of erased files by filename.

SORT BY EXTENSION: Sorts the list of erased files by file extension.

SORT BY TIME: Sorts the list of erased files by date of last modification.

SORT BY SIZE: Sorts the list of erased files by file size.

SORT BY DIRECTORY: Sorts the list of erased files by directory.

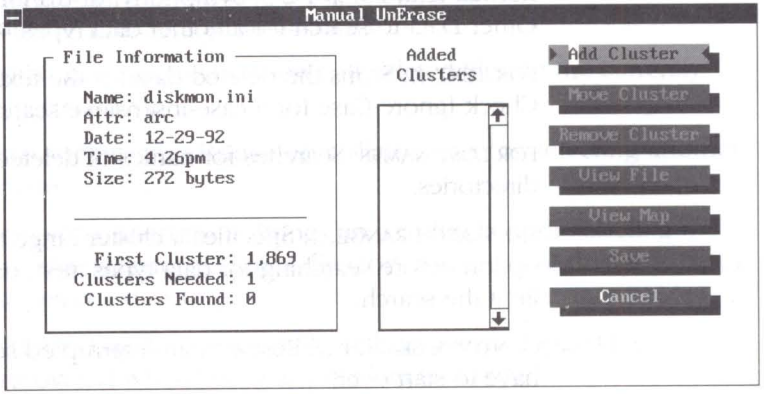
SORT BY PROGNOSIS: Sorts the list of erased files by prognosis for recovery. The prognosis can be Excellent, Good, Average, Poor, Not Applicable, or Recovered.

INCLUDE NON-ERASED FILES: Displays the names of all files currently on your disk, both erased and not erased.

Using Manual UnErase

When you choose MANUAL UNERASE... from the File menu, a dialog box appears asking for the first letter of the filename for the file you want to recover. Then, the Manual UnErase dialog box shown in Figure 34-2 appears.

Figure 34-2 Manual UnErase dialog box



File Information: Listed at the top of this group box are the name of the deleted file, file attributes, date and time of creation, and size. Listed at the bottom of this group box are the location

of the original first cluster, the number of clusters needed, and the number of clusters found.

Added Clusters: Lists clusters added to the file.

Add Cluster: Opens a dialog box for adding clusters to the file.

- Select All Clusters to add all clusters found for this file.
- Select Next Probable to add the next probable cluster.
- Select Data Search to search for clusters containing a specific text string.
- Select Browse to browse through the clusters beginning with the first cluster found for the file.
- Select Cluster Number to specify the starting and ending cluster numbers to add to the file.
- Select Cancel to exit from the Add Clusters dialog box without adding any clusters.

Move Cluster: Moves the current cluster. You can also select a cluster to move by highlighting it in the Added Clusters list and pressing the Spacebar. Arrow heads appear on each side of the cluster number. Move the cluster using the UpArrow and DownArrow keys.

Remove Cluster: Removes the current cluster from the Added Clusters list. You can also remove a cluster by highlighting it in the Added Clusters list and pressing Delete.

View File: Displays the deleted file in hexadecimal or text mode using the current cluster list.

View Map: Displays a map of the entire disk, with the location of all found clusters marked with an "F." An empty square represents free disk space and a filled square represents space used by other files.

Save: Saves the recovered file.

Cancel: Cancels the Manual UnErase procedure.

CHAPTER

35 UnFormat (UNFORMAT)

This chapter explains using UnFormat to:

- Recover a floppy disk formatted with Safe Format
- Recover from an accidental disk format
- Rebuild damaged disks

See "Recovering Disks with UnFormat" in Chapter 3, "Recovery Tutorials," for the step-by-step procedure to recover a disk using UnFormat.

Because UnFormat makes changes to your disks that you cannot undo, do *not* use UnFormat unless you're certain you want to recover your disk.

What It Does

UnFormat (UNFORMAT) restores a disk's boot record, file allocation table, and root directory so you can recover damaged or accidentally formatted disks.

WARNING: If you have an emergency situation and you have not yet installed the Norton Utilities or you cannot access the program from your hard disk, do not attempt to copy UNFORMAT.EXE to your hard disk. Any new files copied to your hard disk might overwrite existing data, preventing complete recovery. Follow the procedure outlined on the Emergency Procedures foldout on the inside front cover of this manual.

How It Works

The information on your disk is stored in two areas: the system area and the data area. The system area contains bookkeeping information—the boot record, the file allocation table (FAT), and the root directory—that DOS uses to find files on your disk. The data area contains the actual data in your files.

On a hard disk, the DOS FORMAT command reinitializes the system area but does not overwrite the data area. Even though the disk appears to be empty when you use the DIR command (the message "No files found" appears), you still have the data that made up your files.

Some older versions of DOS, including Compaq 3.1 and AT&T DOS version 2.11, actually overwrite existing information when they format a hard disk, so UnFormat will not work under these operating systems.

On a floppy disk the DOS FORMAT command reinitializes the system area *and* overwrites the data area, preventing any data recovery. UnFormat *cannot* recover a floppy disk if you have used the DOS FORMAT command in DOS versions earlier than 5.0 (or the /U switch in DOS versions later than 5.0). However, if the DOS FORMAT program was interrupted while formatting a floppy disk, you can attempt to recover any remaining files using UnFormat or UnErase. This may require some manual recovery.

NOTE: To protect your data, always use the Norton Utilities Safe Format program to format floppy disks. See Chapter 29, "Safe Format (SFORMAT)," for information on how to make sure Safe Format is run whenever you issue the FORMAT command.

When you run UnFormat, it searches the disk for lost bookkeeping information stored in a file called IMAGE.DAT created by the Norton Utilities Image program, or MIRROR.FIL created by the DOS Mirror program. These programs take a snapshot of the critical system information area of your hard disk; see Chapter 20, "Image (IMAGE)," for more information.

TIP: To protect against data loss, run Image every time you start your computer. Choose STARTUP PROGRAMS... from the Norton Utilities main screen's Configuration menu and select Save Disk Format Data to place the Image command in your AUTOEXEC.BAT file.

The recovery process is faster and more reliable with an Image or Mirror file. UnFormat can still recover data without either of these files, but it may not completely recover all your files. At a minimum, the root directory will be lost. In some situations, you might not get any useful data.

When to Use It

Use UnFormat to recover a floppy disk formatted with Safe Format or an accidentally formatted hard disk or hard disk partition. You can also use UnFormat to rebuild a disk corrupted due to a power failure or one that has been damaged by a virus.

Although you can run UnFormat from a network, you cannot unformat a network drive.

If you have recurring errors in the FAT, boot-sector, or partition table, always test your disk with a virus protection program like Norton AntiVirus to make sure a virus is not causing the problems.

How to Use It

Choose UnFormat from the Norton Utilities main screen, or type UNFORMAT at the DOS prompt. Select the disk drive to recover. UnFormat then asks if you've created an Image or Mirror file. Answer Yes, even if you're not sure. The Image file, for example, may exist on your disk because other utilities such as Speed Disk and Calibrate create it automatically when they run. If UnFormat finds both Image and Mirror information, the most recent file is used.

NOTE: You can use command-line switches to specify which drive to unformat and whether to use the Image file or the Mirror file. See Appendix C, "Command Line Reference," for more information.

If UnFormat cannot find the Image or Mirror file, it still tries to reconstruct your disk. However, it renames subdirectories directly under your root directory DIR0, DIR1, and so on. Use the RENAME... command from the Directory menu of Norton Change Directory to rename the directories, as described in Chapter 23, "Norton Change Directory (NCD)." All filenames in your root directory will be lost. Use the Manual UnErase procedure to attempt recovery of these files, as described in Chapter 34, "UnErase (UNERASE)."

TIP: File fragmentation makes it harder for UnFormat (and UnErase) to recover files. Use Speed Disk to eliminate file fragmentation, as described in "Optimizing Disks with Speed Disk" in Chapter 5, "Performance Tutorials."

Previous or Recent Version of Image

If UnFormat finds more than one copy of the Image or Mirror file, you can use the most recent version or the previous version. The reason for this is simple: if damage occurs to your disk late in the day, you may not notice it until the next day after you've started your computer. If Image is included in your AUTOEXEC.BAT file (as it should be), Image automatically updated a copy of the damaged system area when you started your computer, thus making the most recent version of the Image file unusable. In this case, select Previous to restore the previous version.

NOTE: When a disk has been accidentally formatted, there is a strong chance that changes were made to the disk after the IMAGE.DAT file was last updated. UnFormat cannot recover any changes not reflected in the Image file.

When Not to Use the Image or Mirror File

In a few situations, you should answer No when UnFormat asks if you've created an Image file. An obvious case is when the Recent and Previous versions of Image or Mirror both contain the error that you are trying to reverse. For example, if you recovered with the Recent version then rebooted your computer,

AUTOEXEC.BAT updated the Image file, but the problem was not corrected. Both versions of the Image file now contain the error.

Another case occurs when a program like CHKDSK reports that the FAT is bad and Norton Disk Doctor cannot fix the problem. If you're technically adept, you can use Disk Editor to copy the second copy of the FAT over the first. Or, you can reformat the drive with Safe Format and then use UnFormat without the Image or Mirror information to reconstruct the FAT.

Full or Partial Restoration

UnFormat asks if you want a Full or Partial restoration of your disk. A full restoration recovers the boot record, file allocation tables, and root directory. Select Full if you're not sure whether you want a partial restoration or a full restoration of your disk. Select Partial only if you know exactly what the problem is.

CAUTION: If you don't know what the boot record, file allocation table, and root directory are, do not select a Partial restoration. If you do so by accident, select Cancel and start over.

If you select Partial, a dialog box lets you specify which parts of the system area you want UnFormat to recover. For example, if your boot record is damaged by a virus, you can specify only the boot record. Or, if the Image or Mirror data is out of date and you have the expertise to recover information manually with UnErase and Disk Editor, you might want to recover the root directory or file allocation table yourself.

CHAPTER

36 Wipe Information (WIPEINFO)

This chapter describes:

- How Wipe Information wipes a disk
- How to use Wipe Information with other utilities to seek out and erase specific information
- Which parts of files or disks Wipe Information can erase
- How to gauge the time duration of different wipe operations

What It Does

Wipe Information (WIPEINFO) protects confidential data by erasing it from the disk so that it is unrecoverable, even using the most sophisticated hardware and software recovery techniques. With Wipe Information, you can:

- Select the area to wipe—the entire disk, specific files, the unused portions of the disk, or the slack area of a file.
- Specify what value to write over the wipe area.
- Specify the number of times to repeat the wipe procedure.
- Select a wipe procedure that meets U.S. government security standards.

Wipe Information has safeguards to avoid accidental data loss. Before each wipe operation, you must respond to a warning message.

Wipe Information replaces WipeDisk and WipeFile in previous versions of the Norton Utilities, combining both functions into one package.

You can wipe files on network drives if you have the network rights to delete (write), but you cannot wipe entire network drives.

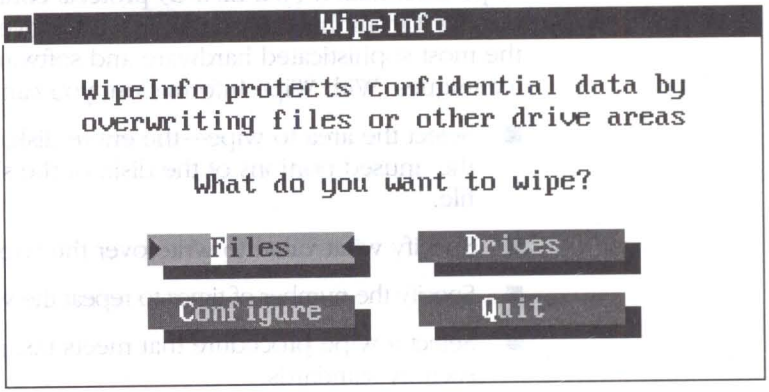
When to Use It

Use Wipe Information to delete or remove a confidential file, clear the slack area of a file, and reuse a disk that may have contained confidential data in the past. Wipe Information can also wipe all data from the hard drive of a rented computer, and wipe an entire branch of a directory tree without affecting other data on your disk.

How to Use It

Choose Wipe Information from the Norton Utilities main screen, or type `WIPEINFO` at the DOS prompt. The WipeInfo dialog box shown in Figure 36-1 appears, giving you four choices: Configure, wipe Files or Drives, and Quit. These options are described in the following sections.

Figure 36-1 WipeInfo dialog box



You can also specify a drive or file to wipe, along with other Wipe Information settings, directly from the DOS prompt. See Appendix C, "Command Line Reference," for more information.

Use Disk Editor and Text Search to inspect the contents of slack areas and unused clusters to determine if they contain data that

you need to erase. Use a combination of File Find, Text Search, and UnErase with Wipe Information to find and remove all traces of specific data from the disk.

Wipe Information automatically disables SmartCan and Disk Monitor because files deleted with Wipe Information—even if not wiped—are not saved by SmartCan.

If you want to delete only a directory tree branch without wiping the data, a faster method is to use the REMOVE TREE... function of Norton Change Directory.

You can wipe all data pertaining to a particular file from your disk, including backup copies, deleted copies, and residual data in clusters now marked as free.

To wipe all data relating to a specific file:

Recover deleted copies of the filename with UnErase. Number these files sequentially but keep the same first name, such as FILENAME.1, FILENAME.2, and so on.

Run Wipe Information and select Files. Substituting the name of your file, type `\filename.*` in the File Name text box of the Wipe Files dialog box. Check the Include Subdirs check box. Select the Wipe Files option button, then select Wipe to wipe the files.

Next, search unused clusters for old fragments of your file using Text Search and Disk Editor. Wipe these clusters using one of the following methods:

- Wipe the identified files' unused slack space
- Wipe the disk's unused space
- UnErase the files responsible for the unused clusters and wipe these files

NOTE: A wipe lasts from a few seconds to several hours, depending on the options you select. A Fast Wipe of one file's slack area takes a few seconds. A Government Wipe of a 1.44 MB floppy disk takes about two hours. A Government Wipe of a complete hard disk is an overnight job.

Configure

Before you wipe any files or drives, select Configure in the WipeInfo dialog box to choose the wipe method you want to use.

- **Fast Wipe** overwrites the selected area one time with 0s. This defeats all but the most sophisticated electronic recovery devices and is faster than the government wipe. You can specify a different wipe character by typing over the 0 in the Fast Wipe description; this does not affect the wipe speed.
- **Government Wipe** executes a government standard wipe using decimal character 246 as the last character. You can change some parameters, but if you do so it may no longer meet government specifications.

Set the Repeat Count field to repeat an entire wipe procedure up to 999 times. Use this feature to enhance the Fast Wipe method.

Select Save Settings to save your wipe configuration to a file so you can use it again. Select OK to return to the WipeInfo dialog box.

Files

Select Files in the WipeInfo dialog box to set wipe options in the Wipe Files dialog box.

File Name: Enter the path and file specification in the text box.

Include Subdirs: Check this check box to search all subdirectories of the current or specified directory for matching filenames.

Confirm Each File: Check this check box to approve wiping for each file that matches the global file specification. With this option unchecked, you see the list of filenames being wiped. If checked, a dialog box lists the first matching filename with a question mark. Respond to this dialog box with one of four choices: Skip to not wipe the highlighted file; Wipe (or Delete) to erase the highlighted file or slack area; Auto to bypass any further prompting to wipe a file; or Stop to cancel the process for the rest of the file list.

Hidden Files and **Read-Only Files:** Check these check boxes to include these types of files in the wipe.

Select a Wiping Method from one of the following option buttons:

- **Wipe Files:** Wipe according to the wipe configuration, zero the file allocation table (FAT) entries, and clear the directory entries (set the first character to ASCII value 229, the remainder of the filename to spaces, and the rest of the entry to zeros).
- **Delete Files Only, Don't Wipe:** Delete files like the DOS DELETE command, but with the addition of the Wipe Files dialog box options for increased power and flexibility.
- **Wipe Unused File Slack Only:** Overwrite slack space without touching current data.

Wipe: Select this command button and follow the confirmations to begin wiping. A dialog box reports the progress. You can select the following command buttons during the operation:

- **Skip:** Skip over this file and continue looking for other matching files to wipe.
- **Wipe:** Wipe the highlighted file.
- **Auto:** Automate the interactive mode so that Wipe Information no longer asks for you to confirm each file before wiping it. You cannot stop this wipe operation after automating it.
- **Stop:** Stop the wiping process and return to the WipeInfo dialog box.

Directory...: Select this command button to enter a new directory name to change the wipe area.

Cancel: Select to exit this dialog box without performing any actions and return to the WipeInfo dialog box.

Drives

Select Drives in the WipeInfo dialog box to select a drive or drives to wipe and check the appropriate Wiping Method check box.

Wipe Entire Drive: This method erases the directory, file areas, and system area. After using the Government Wipe you must reformat the disk.

Wipe Unused Areas Only: This method eliminates data in clusters marked with 0 in the FAT, which includes two areas:

- Deleted files that are not yet overwritten with other files.
- Unused clusters that may have contained data prior to the last format.

Wiping unused areas does not purge data in the file slack space or current files. To wipe these areas, select Wipe Entire Drive (or Wipe Files in the Wipe Files dialog box).

To wipe the drive select OK and follow the confirmations. A dialog box reports on the progress. You can select Stop at any time to interrupt and cancel the operation.

NOTE: When wiping drives, Wipe Information starts with the least critical area of the disk (the clusters that are never used) to give you extra time to change your mind.

PART

IV Appendixes

This part of the *Norton Utilities User's Guide* contains the following appendixes:

- The Disk Companion provides background information on how disk drives work.
- The Troubleshooter provides step-by-step instructions on recovering from most hard disk problems.
- The Command Line Reference provides the command-line switches for each of the Norton Utilities and NDOS.

APPENDIX

A Disk Companion

If you've ever wondered what terms like cluster, file allocation table, boot record, and partition table mean, this appendix is for you. It provides a basic description of disk elements and how they work, and explains concepts that are essential to understanding how the Norton Utilities interact with your computer.

Introduction

In many ways, disks are the most important part of your computer, even though other parts often get more attention. They provide a safe data storage place. All of your data is stored on disks.

To work on a document, you issue a command to your computer to instruct it to search one or more disks for the data. The computer copies the document from disk into its working storage space, or *random access memory* (RAM), to work on it. However, RAM requires power to remember data. Any interruption in power, however brief, and all the data stored in RAM is lost. Therefore, to record changes to the document, you write them back to the disk. The next time you want to work with the document, it's there waiting for you on disk, just as you left it.

Although you rely on disks from day to day, they are subject to a variety of problems. All of us have stored documents on disks that were fine one minute and broken the next. To understand what can go wrong with a disk—whether it's a floppy or hard disk—and to learn how such damage can be repaired, you need to know something about how disks work.

This appendix takes you on a brief tour through the inner workings of disks, beginning by examining disk and disk drive hardware. It describes the basic "building blocks," such as

platters, heads, tracks, cylinders—what they are, how they work, and how they're put together to make a disk drive.

Next, this appendix describes how information is stored on a disk and the fundamental bookkeeping areas. You'll learn how documents are stored on a disk and review the processes of creating, opening, saving, and deleting a document to show how all these pieces work together.

Lastly, this appendix describes what can go wrong with disks and how you can solve these problems using the Norton Utilities, including problems that affect your entire computer system, problems that effect disk volumes, and problems limited to a single document.

The Hardware

Both floppy and hard disks use the same phenomenon as a tape recorder to store data. A recording head magnetizes microscopic particles embedded in a surface; moving the particles past the magnetized head causes the particles to become magnetized. In an audio or digital computer tape, the magnetic medium is a long string of plastic tape embedded with metal particles usually composed of iron oxide (rust). There's nothing magic about that long thin shape; you can create a magnetic recorder with a medium of any shape if you master the mechanics of moving the medium past a recording head.

Tracks

Imagine touching your index finger to an ink pad and then holding it just above a record spinning on a turntable. If you touch the spinning record lightly with your inky finger, you leave a finger-width ring of ink on the record. Now imagine that the record is a floppy disk and your fingertip is a magnetic read-write head. The inky trail your finger left on the disk would be called a *track*.

By applying a digital signal to the read-write head, you record information on the floppy disk track the same way you record it on an audio tape. The only difference is that, with an audio tape, you record a continuously variable signal representing a

sound wave form called an *analog* signal. On a floppy disk, you record either a maximum signal or nothing at all called a *digital* signal.

The circular track on a floppy disk must be thin for the magnetic heads to function correctly. Therefore, a single track of data on the disk occupies only a fraction of the total disk area. But just as you can record two, four, or more tracks on a single audio tape, so you can record multiple tracks on a single disk. And just as with audio tapes, you record multiple tracks in two ways: by adding more heads, each positioned to record its track inside the previous one, or by moving a single head back and forth across the disk. The first method is expensive but fast, since you can record multiple tracks simultaneously. Some high-performance drives use multiple heads per disk surface to achieve speed. The second method—stepping a single head across the disk—is slower but more economical and is used by many manufacturers.

Double-Sided Disks

Just like records, floppy disks have two sides that can be treated with a magnetic coating, allowing you to record on both surfaces. In this respect, disks are different from tape, which is coated and recordable on only one side. With floppy disks particularly, a disk coated with magnetic material on only one side tends to warp.

Recording on both sides of a disk yields economies of scale. A disk drive that records on a single side needs a motor to spin the disk, an apparatus to hold the head against the disk, a second motor to move the head back and forth across the disk, a chassis to hold the whole works, and so on. To record on the flip side doesn't require many additions, just a modification to the apparatus that holds the head—it now becomes a pincer-like affair—and the addition of a second head to the bottom fork of the pincer.

Cylinders

Another benefit to recording on both sides of a disk is that you can write twice as much data before moving the head to the next track. Data can be written first to the track on the top of the

disk; then, without moving the head assembly, more data can be written to the track on the bottom. This pair of tracks that lie over each other are collectively referred to as a *cylinder*.

Cylinders and tracks are numbered for convenient reference. The outermost track is called track 0; the track on the top side of the disk is called track 0, side 0, and the track on the bottom is called track 0, side 1. Or you can refer to both track 0s together as cylinder 0. High density 1.2 MB floppy disks have 80 cylinders, numbered from cylinder 0 (nearest the rim) to cylinder 79 (nearest the spindle).

On a floppy disk, the recording head actually sits directly on the disk's magnetic coating. This allows the head to read and write the strongest signal possible since the strength of the signal diminishes as the distance between the head and the magnetic surface increases. However, friction limits the speed at which the disk can spin, the head must be in constant contact with the flexible disk surface, and the head can damage the disk surface. Because the rotation speed directly affects the reading speed—you can't read bits off the disk any faster than they rotate by the head—floppy disks are slow by nature.

Hard Disks

Hard disks hold the head slightly above the disk, making friction between the head and disk, minor disk surface irregularities, and wearing of the disk surface by the head cease to be problems. Another set of problems arises, however. Since the strength of the signal decreases as the distance between the head and disk increases, the head must be as close to the disk as possible but far enough away so that it doesn't touch the disk as components heat up and expand or because of disk surface imperfections.

To solve this problem, the hard disk recording head acts as a miniature glider. The head actually floats on the layer of air whipped up by the rapidly spinning disk. This air layer is very thin—at about ten microinches (millionths of an inch). Not even a human hair could slide between the head and disk surface.

This method requires a rigid backing (*platter*) for the magnetic coating; a floppy disk spinning at several thousand rpm would flap into the head. In addition, hard disks must be sealed so the

head won't crash into particles lodged between the head and the disk surface and land on the disk. The entire head-disk assembly is assembled in a clean room and the air within the chamber is microfiltered, which raises the price floor for hard disks.

These high manufacturing costs mean that it makes sense to squeeze in as much as possible. An extra disk platter or two only raises the manufacturing cost a little. Typical 80 MB hard disks have 4 to 6 disk surfaces mounted on the same spindle, and a corresponding number of heads mounted to a single arm and moving in tandem.

The numbering scheme for the sides of a multi-platter hard disk is an extension of that for numbering a double-sided drive. The top of the first platter is side 0, its bottom is side 1, the top of the second disk platter is side 2, and its bottom is side 3. And just as both top-side and bottom-side track 0s on a double-sided drive can collectively be called cylinder 0, so the four track 0s in a two-platter drive are collectively referred to as cylinder 0.

The amount of data that a single circular track on a hard disk can hold depends on the data encoding scheme used. Many older hard disks use a variant of an encoding scheme called modified frequency modulation (MFM), with which 8 to 12 kilobytes per track can be reliably read and written. Newer hard disks use the run length limited (RLL) encoding scheme, with which 12 to 18 kilobytes per track can be reliably read and written.

Sectors

Although it is possible to write and read data from a disk in blocks of 12 or 18 kilobytes at a time, these numbers were historically considered too large to be practical. Disk controllers, both floppy and hard, read and write only a segment of a track at a time (a *sector*). The particular number of bytes in each sector depends on the controller hardware and the operating system. The hardware manufacturer designs the controller to support several different sector sizes, and the operating system developers choose from among the available sizes. While sector sizes of 128, 256, 512, and 1024 bytes are supported, versions of DOS use 512-byte sectors exclusively, for both floppy and hard disks.

A floppy disk can include up to 18 sectors per track and maintain reliability. While IBM originally adopted a conservative strategy which used only 9 sectors per track, making only 368K available on floppy disks, high density floppy disks use 18 sectors per track. Today, a 3 ½-inch high density disk includes 18 sectors times 80 tracks times 512 bytes per sector, which multiplies out to 1.44 MB.

With their higher rotational speeds, rigid surfaces, and more stringent manufacturing tolerances, hard disks hold both more tracks per side and more sectors per track. The greatest improvement comes from packing in far more tracks per side than a floppy disk—a typical hard disk may have well over 1200 tracks per inch. The typical RLL-encoded hard disk uses 25 sectors per track. Other high capacity disks use an enhancement of RLL, called Advanced Run-Length Limited Coding (ARLL), which allows about 33 sectors per track. In addition to having a higher data capacity than floppies, the hard disk head can present data to the controller faster.

While dividing the track up into sectors solves certain problems—there's less data to buffer, for one thing—more information is required to find data. To find a piece of data requires the side, track, and sector number within the track.

Disk Performance

The terms *seek time, access time, latency,* and *transfer rate* are often used to measure disk performance. The Norton Utilities Calibrate program measures many of these performance parameters.

Seek Time

Seek time is the length of time the disk head takes to move from the track it is on to the track you want to read. Since this varies each time you read depending on the location of the head and the distance between the two tracks, there are a couple of sub-classes of seek time, the most important of which is track-to-track seek time.

Track-to-track seek time is the length of time required to move from one track to an adjacent track. Track-to-track seek times in AT-class hard disk drives are generally on the order of four to

seven milliseconds. Not surprisingly, seek times for floppy disks are many times greater.

Access Time

Access time is the time required for the head to move to the track that holds the data you want. Clearly, if you left the disk head on track 3 after your last read and you now want to read data from track 4, the access time would be equal to the track-to-track seek time.

Average access time is a measure of the time it takes, on average, to move the head from the current position to the track you want to read. At first glance, it might seem that average access time would be equal to the time required to seek across half the number of tracks on the drive. But after a disk operation, the head may be left anywhere over the disk—the optimal situation would be when it was left in the center of the disk, since then the next access would, on average, be across *half* of half of the total number of tracks, or one-fourth the total.

The average time to access any arbitrary track is equal to the time required to seek across one-third of the tracks. This measurement is independent of the optimizations that an efficient operating system can perform, during which the data to be read sequentially is stored on sequential tracks. Using these optimizations, much of the time you do simply move a single track.

Latency

Two requirements must be satisfied before the disk head can begin reading data. First, it must seek to the required track; second, the particular sector of the track must spin around under the head. Once the head is positioned at the right track, the time the head spends until the right sector comes around is called *latency*.

Average latency is the time required for the disk to make half a revolution. Hard disks spin at 3600 rpm, or one revolution every 16.67 milliseconds, so the average latency is approximately 8.3 milliseconds. All hard disks spin at the same speed, so latency time won't help you compare one hard disk with another. But it's interesting to note that floppy disks, spinning at 300 or 360

rpm, have an average latency of more than 100 milliseconds, far greater than the average for hard disk latency.

Many newer hard disks include full track buffering. This allows a drive to read the entire track at once, which altogether eliminates the latency issue.

Transfer Rate

Transfer rate is the speed at which the controller reads bits off the disk; that is, the speed at which they are transferred from the disk to the computer. The transfer rate depends both on how fast the disk is spinning and how densely bits are packed around the track. Here again, hard disks dramatically outperform floppy disks, both because of the hard disks' higher rotational speed and because of their higher bit-packing density.

Transfer rates have also benefited from technological advancements. Most hard disks today use one of three interface standards known as Enhanced Small Device Interface (ESDI), Small Computer Systems Interface (SCSI), and Intelligent Drive Electronics (IDE). With the implementation of these standards, transfer rates have increased from 5 to up to 15 megabits per second.

Sector Addressing

After the head moves to the correct track, it must recognize the sector containing the data you want. In early floppy disks, holes were punched at regular intervals around the circumference of the disk. Each hole marked the beginning of a sector. This method was called *hard sectoring*.

Hard sectoring didn't adapt well to high-performance drives. To identify sectors on modern disks, each sector's address is encoded into the sector's data during formatting. This approach is called *soft sectoring*.

In soft sectoring, the address goes into a kind of preamble to the sector data itself. At the head of this preamble, a unique sequence of special synchronization bytes tell the controller that it's about to read a sector address. Lastly, the preamble contains gap bytes—filler bytes placed between sectors to create a timing tolerance for the reading of each sector.

If the sector preamble is destroyed or difficult to read, the message "Sector Not Found" appears and data is lost. The Calibrate program can refresh the sector preamble to prevent this type of loss.

Low-Level Formatting

Writing the sector addresses, synchronization bytes, gap bytes, and other types of data into the sector preamble is called *low-level, hard,* or *physical formatting,* because only the controller can do the job. During low-level formatting, software tells the controller to format a track, picks one of the available sector sizes, and specifies other parameters. Then, the controller executes the format.

A soft-sectored disk must be low-level formatted before it is used for data storage. A second process, called *logical formatting* (discussed later) must also take place before a disk stores data.

Physical and logical formatting can be confusing because the DOS FORMAT command or the Norton Utilities Safe Format program carry out both aspects of the job for floppy disks, but only logical formatting for hard disks. When you format a floppy disk, the low-level format is followed by a logical format. On a hard disk, low-level formatting is skipped.

Disk Interleave

You may want to perform a low-level format on a hard disk to change the *disk interleave.* A low-level format writes each sector address into the sector preamble. Sometimes, sectors are numbered sequentially around the track, but they don't have to be. There are good reasons *not* to number sectors sequentially.

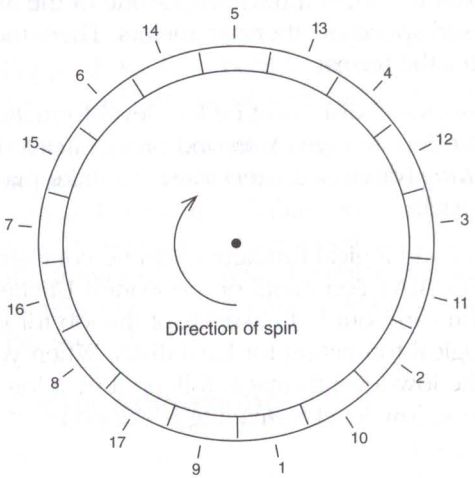
If the computer's performance perfectly matches the hard disk, sequential sector numbers would be appropriate. As data comes flowing from the controller, the computer transfers the data into memory, returning to the controller just in time to grab the next batch of data read.

However, most computers don't match perfectly. On most computers, the controller reads a sector, and the computer stores it away. The computer returns to the controller, ready for

more data. But by now, the next sequential sector has passed the head, and the third sequential sector is about to come under the head. Now the computer must wait while the disk makes nearly a full revolution to the beginning of sector 2.

This is the worst match possible; it yields only one sector of data for each disk revolution. However, since the sector addresses are simply data—a special kind of data, but data nonetheless—they can be changed. For example, every other sector can be labeled sequentially around the track as shown in Figure A-1.

Figure A-1 Interleave



Proceeding around the track, the first sector is sector 1, then skip a sector, then sector 2, then skip, then sector 3, and so on. Returning to the beginning, sector 10 is between sectors 1 and 2, sector 11 between 2 and 4, and so on. This changes the *interleave factor* from 1 to 2. When reading sequential sectors from the disk, the computer has twice as much time to process a sector before the next one spins by. Instead of needing seventeen revolutions to get all the data on a seventeen-sector track, this interleave requires two.

Changing the interleave factor during a low-level format tunes the performance of a hard disk. However, if you lower the interleave factor to the point where the computer can no longer keep up with the disk, performance plummets. The Calibrate program calculates the optimal interleave factor for your computer system and automatically adjusts your disk to this new interleave without requiring you to back up your disk first.

NOTE: Most newer computers have advanced controllers and high-speed disks already configured for optimum performance. If you have a such a computer, Calibrate indicates that you have a non-adjustable interleave and performs a nondestructive read/write test.

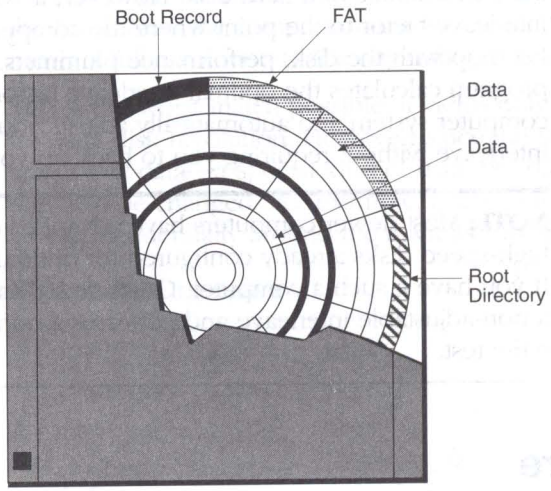
The Software

So far, this appendix has dealt with physical characteristics of the disk hardware. The software characteristics determine how the operating system organizes and finds data.

For speed and efficiency in accessing particular bytes on a large disk, the operating system constructs directories and indexes describing what's occupied, what's free, and what parts should never be used due to physical damage. This type of disk information is called the *logical format*, and the process of writing the directories and indexes that support this organization is called *logical formatting*.

On any kind of disk—hard or floppy, fixed media or replaceable—DOS uses the same logical format to organize the disk into four main areas as shown in Figure A-2: the boot record, the file allocation table (FAT), the root directory, and the data area. Hard disks have a fifth area, the partition table, which is described later.

Figure A-2 Floppy disk structure



The Boot Record

The DOS boot record occupies the first sector of the first track of the first disk side—sector 1, track 0, side 0. (Actually, this is strictly true for floppy disks—hard disks reserve the first sector for the partition table.) The boot record lets the computer pull itself by its bootstraps by reading a short program—the boot code—that in turn reads in the rest of the operating system.

In addition to the small boot program, the boot record contains a list of key characteristics about the disk, including the number of bytes per sector, the number of sectors on the disk, the number of sectors per track, and the number of heads. Since this table contains vital information, the boot record is written to all disks during logical formatting, even disks that don't contain the DOS system files necessary to make a bootable disk. Figure A-3 shows an example boot record.

Figure A-3 Boot record

Description	Boot Record Data	DOS Reports
Sector 0		
OEM ID:	IBM 5.0	
Bytes per sector:	512	512
Sectors per cluster:	4	4
Reserved sectors at beginning:	1	1
FAT Copies:	2	2
Root directory entries:	512	512
Total sectors on disk:	(Unused)	
Media descriptor byte:	F8 Hex	
Sectors per FAT:	225	225
Sectors per track:	34	
Sides:	7	
Special hidden sectors:	34	
Big total number of sectors:	230112	230111
Physical drive number:	128	
Extended Boot Record Signature:	29 Hex	
Volume Serial Number:	426856470	
Volume Label:	NO NAME	
File System ID:	FAT16	

The second and third areas that DOS sets up during logical formatting—the FAT and the root directory—keep track of where each file is stored, which sectors are used, and which are free. These areas are described in detail later in this appendix.

Clusters

Once a disk is formatted, the smallest data chunk that the controller can read or write is a sector, which equals 512 bytes for all DOS disks. With floppy disks, DOS keeps track of the status of each sector. This would require a large amount of overhead on a large-capacity disk, so DOS deals instead with multi-sector units called *clusters*.

Before looking closer at clusters and how DOS keeps track of files on a disk, let's look at some of the problems DOS encounters when you ask it to create, expand, contract, and delete files.

File Fragmentation

The basic problem with managing computer files is that they're constantly changing. Suppose that you are writing a 2250-byte file to an unused 1.2 MB floppy disk. The minimum number of bytes DOS will read or write on this disk is a 512-byte sector, so the 2250-byte file needs five sectors. The first four sectors hold 2048 bytes, so the file uses only 202 bytes of the last sector.

Since DOS can't write a partial sector, it reserves all of the fifth sector for the file, letting the remainder of the sector go to waste.

Then, you write a second file in the next seven sectors of the data area. Then, you add 460 bytes to the first file. Only 202 bytes of the last sector was in use, so 310 bytes can go there. But that leaves 150 bytes; where do they go?

They can't go in the first sector after the five-sector file, because that sector is used by the next file. DOS could conceivably move that next file up a sector, but that would take some time. Besides, if the next megabyte of sectors were already taken by files, DOS would have to move a megabyte of data just to write 150 bytes. Therefore, DOS writes the file to non-contiguous, or fragmented, clusters. This is not a problem so long as DOS can find all the pieces and link them all together.

The File Allocation Table

DOS maintains a file allocation table (FAT) to keep track of the status of all the clusters. The FAT is so important that DOS stores two identical copies of it. When a file expands, DOS looks in the FAT to find and reserve the next free cluster. In the example above, the FAT identifies the next free cluster from the beginning of the data area.

Since clusters are defined by DOS, DOS defines the number of sectors they contain. Rather than settling on a single cluster size, DOS varies the size to suit the medium. The cluster size of a disk is set during logical formatting and does not change unless you reformat the disk. An 80 MB hard disk has a cluster size of 4 sectors, or 2048 bytes. The 1.2 MB floppy disk has a cluster size of one sector—512 bytes. That small cluster size reflects a tradeoff of speed for optimal use of available space. Smaller clusters require more entries in the FAT, more read and write operations, and so on. However, the smaller cluster size means the less space wasted at the end of each file.

In the example in the preceding section, the 2250-byte file occupied 5 sectors on a high-capacity floppy disk. Since each cluster on this floppy disk consists of a single sector, this file only wasted the bytes at the end of the last sector, about 200 bytes. Suppose you moved that same file to an 80 MB hard disk, formatted with a cluster size of four sectors. DOS uses the FAT

to keep track of space on a cluster-by-cluster basis. Since an 80 MB disk has a four-sector (2048 byte) cluster size, the minimum amount of space DOS can allocate on that disk is 2048 bytes. The 2250-byte file takes only two clusters when you move it, but since the clusters are now 2048 bytes each, the number of wasted bytes at the end of the last cluster is more than 1800. This unusable space is called slack. It's the reason files sometimes seem to shrink or expand when you move them between hard and floppy disks. The greater slack intrinsic to larger cluster sizes is the trade-off for improved performance.

Cluster Numbering

Before you can understand how DOS actually stores information in the FAT, you must first understand how DOS numbers clusters.

The controller refers to a particular location using the side, track, and sector numbers, so the PC must specify disk locations using the same system—which is the function of the built-in ROM-BIOS. For the operating system, this system is awkward since the number of tracks, sectors, and sides all change from one disk to the next.

DOS therefore locates data by a one-dimensional sector numbering scheme called logical sector numbering, where all sectors are numbered sequentially, starting with sector 1 of side 0, track 0. DOS numbers all sectors in a cylinder before moving to the next cylinder to minimize head movement and access time when reading sectors sequentially. Unlike physical sector numbers, which start at 1, logical sector numbers start at 0. Numbering the disk sectors sequentially serves as a translation between the ways DOS and the ROM-BIOS and controller refer to a sector.

The cluster numbering scheme skips over the sectors occupied by the system area, the boot record, the FAT, and the root directory. The cluster numbering scheme begins with the data area. On a disk with a cluster size of four sectors, the first four sectors of the data area are called cluster 2 (cluster numbering starts at 2, not 0 or 1), the next four sectors are cluster 3, and so on. An 84 MB disk drive, with a cluster size of 4 sectors, would have about 41,937 clusters of data area; the last cluster number would be 41,938, one larger than the number of clusters.

Storing Information in the FAT

The first two FAT entries are reserved for special information. The third FAT entry holds information about the first cluster (cluster 2). The next entry holds information about the second cluster (cluster 3), and so on, so that the last FAT entry tells us the status of the last cluster on the disk. (Strictly speaking, some of these details pertain to all floppy disks but only to hard disks with a single partition.)

Each FAT entry contains key information. For example, since even the best disks can have a few bad sectors, the FAT entry for a given cluster indicates if there's a bad sector anywhere in the cluster so that DOS knows not to allocate that cluster. DOS records information about bad sectors when it creates the FAT during logical formatting. This process is called bad sector mapping, and is very important to data integrity.

When DOS or Safe Format formats a floppy disk, it writes a special byte (F6 hexadecimal) across all of the data area. After DOS finishes formatting a disk, it attempts to read that byte from every sector on the disk. When the controller is unable to read a sector, it passes an error message to DOS, and DOS marks the cluster containing that sector as bad. A few other sectors may be read okay by the controller but have incorrect cyclic redundancy check bytes, indicating there has been an error in reading the data.

When a sector is written, a checksum value, known as a *cyclic redundancy check* (CRC), is calculated, based on the value of the bytes written. This value is written to disk immediately following the sector data. When the sector is later read, its CRC bytes are also read. The same calculation is performed again, this time on the data that was just read. The CRC calculated from the data read is compared to the CRC calculated from the data when it was written. If these values don't match, a read error has occurred. Norton Disk Doctor marks the cluster containing that sector as bad so that area of the disk won't be used again.

In addition to information on whether the cluster is occupied and whether it is bad, the FAT indicates where all non-contiguous clusters belonging to a file are located. Each FAT entry used by a file points to the next FAT entry in the file. In this way, a chain of FAT entries for the file is created, with each entry pointing to the next as shown in Figure A-4. The sequence

number of each FAT entry is the same as the cluster it is reporting on, so DOS follows a file's chain in the FAT to locate each cluster in the file.

Figure A-4 Cluster chains in the file allocation table

Sector 1							
		3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	<EOF>	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	<EOF>	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	<EOF>	196	64
65	66	67	68	69	70	71	<EOF>
73	74	<EOF>	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	<EOF>	93	94	95	96
97	98	99	<EOF>	101	102	103	104
105	106	107	108	109	110	111	112
113	114	115	116	<EOF>	118	119	120
<EOF>	122	123	124	125	126	127	128
<EOF>							

To locate the beginning of the chain, DOS keeps a list of the starting FAT entry for each file. From the first FAT entry, DOS can find the first cluster. Since each FAT entry points to the next in the chain, DOS can find all the clusters in the file.

DOS also needs to find the last cluster in a file. That information could go in the same place as the starting cluster information, by listing either the last cluster number or the file's size. Alternatively, the FAT entry could contain a special byte that corresponds to the last cluster of each file. In a way, DOS uses both methods—the *file directory* (described in detail later) records both the length of each file and its starting cluster number, and the last FAT entry of each file is specially marked.

The FAT is a table of entries corresponding to each cluster on the disk. Each entry indicates whether its associated cluster is available, bad, or in use by a file. If the cluster is in use, the entry either points to the next cluster/FAT entry of the file, or indicates that the cluster is the last cluster of the file. So a FAT entry can contain one of the five values listed below.

Value (hex)	Meaning
0000	Available cluster
0002–FFEF	Cluster in use by a file (the number points to the next cluster in the file)
FFF0–FFF6	Reserved; not used
FFF7	Bad cluster; do not use
FFF8–FFFF	Last cluster in a file

The Root Directory

The root directory is the last part of the system area of any disk formatted by DOS. If you look at a directory using Disk Editor, you'll see that each directory entry holds more information than just the starting cluster number and size of each file. In addition, each directory entry lists the filename associated with the starting cluster number.

Looking at it another way, there is one directory entry for each file on the disk and a file's directory contains a pointer to its first entry in the FAT chain. In addition, each directory entry contains time and date fields, a file attributes field, and additional bytes reserved by DOS.

The attributes represent special properties that can be applied to a file, such as read-only, hidden, system, volume label, subdirectory, and archive. The attributes are bit-encoded; an attribute is set if its associated bit is a 1.

The volume label attribute presents an unusual situation. No file actually exists for a directory entry with this attribute. Only one directory entry in a disk should have the volume label attribute, and that entry should be in the disk's root directory. The label is stored in the filename and extension fields of the directory entry, which in this case are treated as a single field.

The root directory is different from its subdirectories. The root directory, the only directory in the system area, is located immediately following the FAT. The root directory size and location are established during logical formatting and cannot be changed afterward. Subdirectories, on the other hand, you can create, enlarge, shrink, and delete as necessary.

Root directory size varies with the type of disk. On a 1.44 MB floppy disk, FORMAT creates a root directory with room for 224 entries. On most hard disks, FORMAT creates a root directory

that can hold 512 entries. If you want more than 512 files on an 84 MB hard disk, you must create some subdirectories.

An entry in the root directory can refer to a file or a subdirectory. A subdirectory is like a file in form, but like the root directory in function. Because subdirectories are stored in the data area, they are assigned space as though they were files, on an as-needed basis. They can grow, expand, and be deleted like a file. But, rather than holding data, they hold other filenames.

Filenames

Each directory entry contains the filename, file size, date and time of file creation (or last modification), and the starting cluster number (FAT entry). The filename field is an 11-byte area, divided into an 8-byte name field and a 3-byte extension field. Filenames of fewer than eight characters are padded to the right with spaces immediately followed by the extension, padded with spaces to three bytes. The dot is assumed to be between the eighth and ninth characters. A filename is always stored in CAPITAL letters. If you ever change a filename using Disk Editor, use CAPITAL letters, because DOS does not recognize lowercase letters in a filename.

Just as a FAT entry can be a pointer to the next entry in the chain or one of three special codes, so the first byte of the filename field can either be the first letter of the filename, or one of three special codes.

- A 0 as the first byte indicates a completely unused directory entry. This indicates the end of active directory entries.
- A period character as the first byte indicates that the entry is reserved by DOS for use in navigating around the directory structure.
- A lowercase Greek sigma character (σ, E5 hexadecimal) as the first byte indicates that the file has been erased. UnErase represents the sigma character as a question mark, to indicate that it represents an erased and now unknown character.

Fortunately, DOS does not erase the data in an erased file. It simply marks the first byte of the filename with a sigma to

indicate that the file has been erased, then replaces the file's FAT entries with 0s. Since it doesn't erase the data or the starting cluster number in the directory, UnErase can find and recover the first cluster, provided it hasn't been overwritten.

Using its knowledge of the disk structure, directory, and FAT, UnErase can often recover the rest of the clusters of an erased file automatically. UnErase knows how many clusters to look for, since the erased file's length in the directory is not overwritten. Sometimes the file is badly fragmented and UnErase either can't locate the right clusters or finds the right clusters but puts them together in the wrong order. For this problem, use the Manual UnErase option to combine what you know about your file and what UnErase knows about your disk, and recover even badly fragmented and partially overwritten files.

To be on the safe side, save copies of your root directory and FAT with Image. Image takes a snapshot of your system information and saves it to the disk. When you need to recover a file, UnErase uses this information to recover it.

The Partition Table

For floppy disks and some special hard disks, the system area is divided into three contiguous parts—the boot record, the FAT, and the root directory. However, the system area of most hard disks includes an additional component designed to accommodate multiple operating systems.

DOS sets up multiple partitions, with one partition for each operating system. Since one operating system can't read data from another operating system's partition, some area of the disk must be common to all partitions. This common area, the partition table (Figure A-5), specifies the location and length of each operating system's partition.

Figure A-5 Partition table

		Starting Location			Ending Location			Relative	Number of
System	Boot	Side	Cylinder	Sector	Side	Cylinder	Sector	Sectors	Sectors
BIGDOS	Yes	1	0	1	6	966	34	34	230112
unused	No	0	0	0	0	0	0	0	0
unused	No	0	0	0	0	0	0	0	0
unused	No	0	0	0	0	0	0	0	0

The partition table is always found in the first sector of any partitionable disk (just as the boot record is found in the first sector of any non-partitionable disk). The partition table must be set up before logical formatting, the type of formatting the DOS FORMAT command or Safe Format does on a hard disk. The DOS command FDISK sets up the partition table. Before you can use a hard disk, you must first run FDISK, then run DOS FORMAT or Safe Format.

If the partitioned disk is also the boot disk, the partition table specifies which operating system to start up at boot time. On a non-partitionable disk, the first sector is always the boot record, a short program that loads in the rest of DOS. Partitionable disks also put a boot record in the first sector, as a part of the partition table called a master boot block.

When you boot from a partitionable disk, DOS reads the code in the master boot block. That code finds out which partition is active and reads the corresponding boot code. If the DOS partition occupies the entire disk, the master boot code reads the DOS boot record, which reads in the rest of DOS. If there are two partitions and UNIX is active, the master boot code reads the boot code from the UNIX partition, which reads in the rest of UNIX.

Besides the partition table, the remainder of a partitionable disk is organized as described above, except that now the description of the organization of a DOS disk applies only to the DOS partition. In the typical case, where the DOS partition occupies the entire disk, the only difference is that everything moves forward one track for the partition table. Although the partition table uses only the first sector of track 0, the remaining sectors on the track are usually skipped anyway. The DOS boot record still starts at sector 1, but of track 1; the FAT would start at sector 2, track 1, and so on.

Fixing Disk Problems

Now that you know how a disk should work, you can more easily understand the types of things that can go wrong and how to avoid or fix them.

Between the directory and FAT, several things can go awry. For example, a FAT cluster might be marked as in use, yet not be part of any file's allocation chain. This situation is called a lost cluster. In a different situation, one FAT entry for a cluster could point back to an entry that just pointed forward to this entry, creating a circular chain. In a third example, the FAT chains for two or more entries could point to the same cluster, meaning a single cluster was allocated to two different files—a mistake called a cross-linked file.

Though such errors can happen for unidentifiable reasons, they may also occur when you turn off your machine while an application still has a file opened or is in the process of writing to the disk. To avoid such errors, quit your applications before shutting down.

Norton Disk Doctor can spot, report, and fix these errors with minimal user intervention. With Norton Disk Doctor, even a relative novice can correct a variety of problems. Norton Disk Doctor checks for and fixes physical disk errors, such as unreadable sectors. It can reformat bad sectors and write back the old data. It can detect and fix bad partition tables and boot records, as well as problems with the FAT and the root directory. These are just a few examples of functions Norton Disk Doctor provides that the DOS CHKDSK program does not.

Conclusion

You now have a good basic understanding how disks work. Although this appendix didn't cover everything about disks, it covered important concepts and terms you're likely to run into. Hopefully, you'll use the Norton Utilities to test some of the material you've learned and discover a few new items. You'll discover that the Norton Utilities are as much fun for exploring your disk as they are useful for recovering data.

APPENDIX

B Troubleshooter

This appendix is a collection of procedures for hands-on correction of disk and file problems. Over the years, the Norton Utilities Technical Support team has compiled, tested, and refined these procedures from the problems most commonly called in by our users. This appendix takes you directly to the problem-solving level of disk technology.

Norton Disk Doctor can automatically solve most of the problems you will encounter with your hard or floppy disks. Use the procedures in this appendix if your problem is one of the few that Norton Disk Doctor cannot solve, or if you want to take personal control of the repair and recovery process.

If you are not familiar with Disk Editor, Norton Disk Doctor, and the other utilities used in this appendix, read the "Tools of the Trade" section below. It provides basic instructions on how to locate, load, and use these utility programs. Also, see the "Diagnosing Disk Problems" section later in this appendix to learn how to diagnose your problems quickly and effectively.

Tools of the Trade

The Norton Utilities Disk Editor and Norton Disk Doctor are the most critical tools for data recovery success. This section presents the basics of loading and using Norton Disk Doctor, Disk Editor, and the DOS CHKDSK program for the first-time user. For complete information related to these Norton Utilities programs, see "Diagnosing Disks with Norton Disk Doctor" in Chapter 3, "Recovery Tutorials," and Chapter 9, "Disk Editor (DISKEDIT)." For details on CHKDSK, refer to your DOS manual.

Booting Your Computer from a Floppy Disk

If you cannot start your computer from the C: drive, you need to start from a bootable DOS system disk from the A: drive.

If you do not have a bootable system disk for your A: drive, you need to make one as described in "Restoring with Rescue Disk" in Chapter 3, "Recovery Tutorials," or in your DOS manual.

To start your computer from your A: drive:

1. Insert the bootable system disk into the A: floppy drive.
2. Press the Ctrl, Alt, and Del buttons simultaneously to reboot your computer.

When you see the A: prompt on your screen, you have successfully started your computer from the A: drive.

Using Norton Disk Doctor

In general, Norton Disk Doctor can automatically diagnose, detect, and repair most disk problems. In fact, you should always run it before trying any of the procedures in this appendix.

To diagnose the problem drive, you need to know how to access and run Norton Disk Doctor from either the Emergency Disk or your hard drive.

To run Norton Disk Doctor from the Emergency Disk:

1. Place the Emergency Disk in the floppy disk drive.
2. Switch to the appropriate drive by typing A: or B: and pressing Enter.
3. Type `NDD drive:` where "drive:" is the disk you want to diagnose. For example, if you want to check the C: drive, type `NDD c:`.

To run Norton Disk Doctor from the hard drive:

1. Switch to the hard drive where Norton Disk Doctor is located.

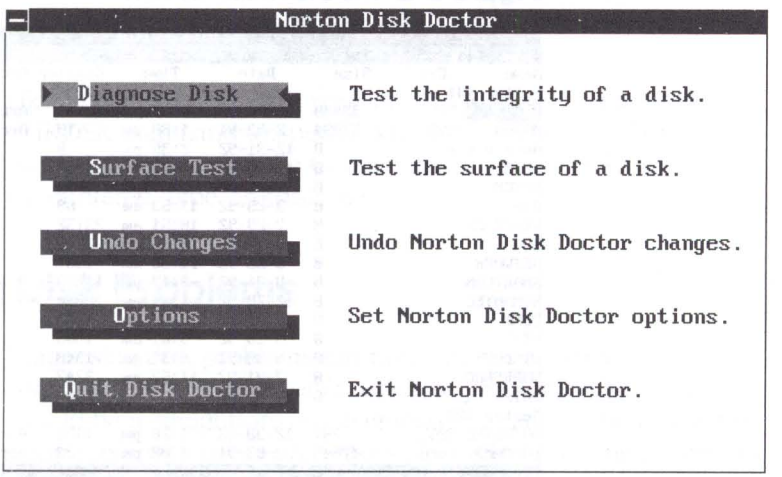
2 Switch to the Norton Utilities directory by typing `cd\path` where "path" is the name of the Norton Utilities directory.

   For example, if you installed the Norton Utilities on the C: drive in the directory NU, type `c: cd\nu`.

3 Type `NDD drive:` where "drive:" is the disk you want to diagnose. For example, if you want to diagnose your C: drive, type `NDD c:`.

The Norton Disk Doctor main menu appears and you are ready to diagnose the disk (Figure B-1).

Figure B-1 The Norton Disk Doctor main menu



Using Disk Editor

Disk Editor is a logical and physical sector editor that allows total access to all areas of a hard or floppy disk, whether DOS recognizes them or not. This ability to edit virtually any part of any disk makes Disk Editor the best tool for the most demanding troubleshooting tasks.

If you have not installed the Norton Utilities on to your hard drive, you need to run Disk Editor from the Emergency Disk. If you have already installed the Norton Utilities on your hard drive, you can run Disk Editor from that drive.

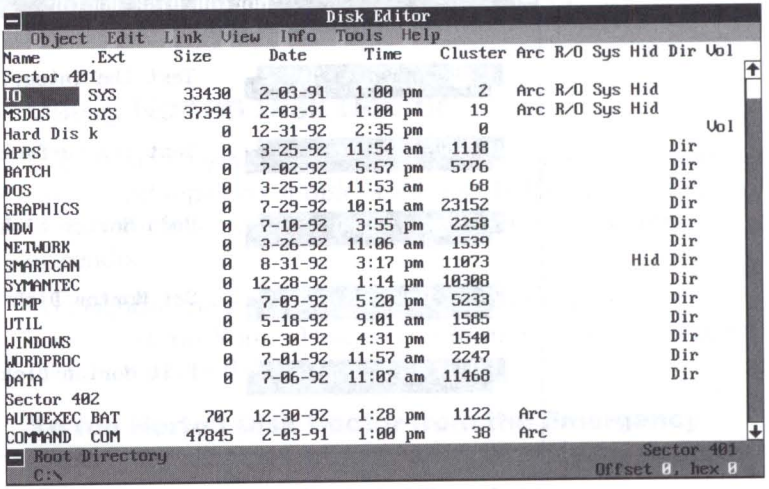
To run Disk Editor from the Emergency Disk:

1. Place the Emergency Disk in either the A: or B: drive.
2. Type `a:` or `b:` to switch to the drive with the Emergency Disk.
3. Type `DISKEDIT`.

   The message "The Disk Editor is currently in Read-Only mode" appears.
4. Select OK.

   The Disk Editor screen appears as shown in Figure B-2.

Figure B-2 The Disk Editor screen


Disk Editor
Object Edit Link View Info Tools Help
Name .Ext Size Date Time Cluster Arc R/O Sys Hid Dir Vol
Sector 401
IO SYS 33430 2-03-91 1:00 pm 2 Arc R/O Sys Hid
MSDOS SYS 37394 2-03-91 1:00 pm 19 Arc R/O Sys Hid
Hard Dis k 0 12-31-92 2:35 pm 0 Vol
APPS 0 3-25-92 11:54 am 1118 Dir
BATCH 0 7-02-92 5:57 pm 5776 Dir
DOS 0 3-25-92 11:53 am 68 Dir
GRAPHICS 0 7-29-92 10:51 am 23152 Dir
NDW 0 7-10-92 3:55 pm 2258 Dir
NETWORK 0 3-26-92 11:06 am 1539 Dir
SMARTCAN 0 8-31-92 3:17 pm 11073 Hid Dir
SYMANTEC 0 12-28-92 1:14 pm 10308 Dir
TEMP 0 7-09-92 5:20 pm 5233 Dir
UTIL 0 5-18-92 9:01 am 1585 Dir
WINDOWS 0 6-30-92 4:31 pm 1540 Dir
WORDPROC 0 7-01-92 11:57 am 2247 Dir
DATA 0 7-06-92 11:07 am 11468 Dir
Sector 402
AUTOEXEC BAT 707 12-30-92 1:28 pm 1122 Arc
COMMAND COM 47845 2-03-91 1:00 pm 38 Arc
Root Directory
C:\
Sector 401
Offset 0, hex 0

To run Disk Editor from your hard drive:

1. Switch to the hard drive where Disk Editor is located.
2. Switch to the Norton Utilities directory by typing `cd\path` where "path" is the name of the Norton Utilities directory. For example, if you installed the Norton Utilities in the C: drive under the directory NU, type `c: cd\nu`.
3. Type `DISKEDIT` and select OK.

   The message "The Disk Editor is currently in Read-Only mode" appears.

4 Select OK.

The Disk Editor screen appears as shown in Figure B-2.

Using CHKDSK

Use the DOS CHKDSK program to save lost clusters to files or correct cross-linked clusters. CHKDSK is installed automatically by all recent versions of DOS.

To diagnose your disk with CHKDSK:

- Type `chkdsk` at the DOS prompt.

  If you add the /F switch, CHKDSK repairs any problems it finds. For example, `chkdsk /f` checks the current disk and repairs any detected problems.

Like Norton Disk Doctor, you can add a drive letter after the CHKDSK command to specify which drive to check. For example, to diagnose the C: drive and fix any problems encountered, type `chkdsk c: /f`.

Diagnosing Disk Problems

Diagnosing disk problems can range from very easy to very complex. Sometimes a combination of problems makes what should be a straightforward diagnosis frustrating. The following steps attempt to cover every possible angle, using the process of elimination to help you home in on your problem.

Start by running Norton Disk Doctor, which attempts to diagnose and, if possible, fix any problems it uncovers.

TIP: Whenever you encounter a disk related problem, *always* start by running Norton Disk Doctor; it is very fast and solves most disk problems automatically.

Using the Norton Advisor

If Norton Disk Doctor cannot fix the problem, look up problem symptoms, explanations, or error messages in the Norton Advisor to pinpoint the best solution for the problem. Many

solutions require you to run recovery procedures detailed in this appendix. If so, look in the table of contents to locate the proper procedure.

To use the Norton Advisor:

1. Type NORTON at the DOS prompt and press Enter.

   The Norton Utilities main screen appears.

2. Choose THE NORTON ADVISOR from the Help menu.

3. Select Common Disk Problems from the Norton Advisor index and scroll through the problems list using the UpArrow and DownArrow keys.

4. Highlight the problem you are experiencing.

   The Explanation box provides detailed symptoms and explanations of the problem.

5. Verify the symptoms with those you're experiencing. If they match, follow the instructions in the Action box to fix the problem.

If you are experiencing a problem that returns a DOS error message, look the message up in the Norton Advisor's list of DOS Error Messages.

To diagnose DOS error messages using the Norton Advisor:

1. Type NORTON at the DOS prompt and press Enter.

   The Norton Utilities main screen appears.

2. Choose THE NORTON ADVISOR from the Help menu.

3. Choose DOS Error Messages from the Norton Advisor index.

4. Scroll through the list of messages and highlight the error message you are receiving.

5 Select the message to view a detailed explanation of the DOS error message and the best course of action to correct the problem. Follow the instructions to correct the problem.

If you are experiencing problems not covered in the Norton Advisor's Common Disk Problems or DOS Error Messages lists, run the DOS CHKDSK program without the /F option to see if it reports any errors. If so, look the message up in the Norton Advisor's list of CHKDSK Error Messages.

To diagnose CHKDSK errors using the Norton Advisor:

1 Type NORTON at the DOS prompt and press Enter.

The Norton Utilities main screen appears.

2 Choose THE NORTON ADVISOR from the Help menu.

3 Choose CHKDSK Error Messages from the Norton Advisor index.

4 Scroll through the list of messages and highlight the error message you are receiving.

5 Select the message to view a detailed explanation of the CHKDSK error message and the best course of action to correct the problem. Follow the instructions to correct the problem.

If CHKDSK fails and a DOS error message is returned, look the message up using the "To diagnose DOS error messages using the Norton Advisor" procedure above. Otherwise, go to the following section to see if you are experiencing a software conflict.

Determining If a Software Conflict Exists

Some problems are caused by conflicts between device drivers loaded from the CONFIG.SYS file, or terminate-and-stay-resident programs (TSRs) loaded from the AUTOEXEC.BAT file, at system startup.

NOTE: TSRs and memory-resident programs are synonymous.

Use the procedures below to determine which device drivers or TSRs are conflicting with each other.

To determine if you have a software conflict:

- Attempt to recreate the problem by starting "vanilla." This means starting your computer from a bootable system disk that has no CONFIG.SYS or AUTOEXEC.BAT files.

This determines whether the problem you're experiencing is hardware or software related. If your disk works fine by starting "vanilla," the problem is probably a conflict with some software in your AUTOEXEC.BAT or CONFIG.SYS file.

To diagnose a software conflict:

- Add back one TSR or device driver at a time to your AUTOEXEC.BAT and CONFIG.SYS file. Restart the computer after each addition until the problem recurs.

  To add programs to these two startup files, use a text editor such as EDLIN or EDIT, both of which are supplied with DOS. Usually these programs are in your DOS directory. For more information, refer to your DOS manual.

Questions to Ask Yourself

Ask yourself the following questions to help determine the cause of a disk problem:

- What happened to the computer? Specifically, what was the last action your computer performed?
- Can you consistently reproduce the problem? If so, how?
- Does the problem occur only on this computer? If yes, what is peculiar about the computer?
- Has the problem occurred before? If not, what are you doing differently or what have you changed on your computer?

Sometimes a temporary bug in memory can cause problems. Rebooting the computer almost always corrects this kind of problem.

Fixing Overwritten Files

Overwritten files are handled differently from one version of DOS to another. DOS 2.xx overwrites an old file with a new file of the same name, destroying as much data as the size of the new file. DOS 3.xx and later write the new file with the same name to another part of the disk if there is enough room. Data clusters for the original file probably have not been overwritten and are thus recoverable.

The type of file plays an important role in determining the success of the recovery. Files containing text data, usually created by text editors or word processors, enjoy higher recovery rates than files containing specialized data such as spreadsheets and graphics.

Even if you recover partial data from overwritten text files, you can still use the data because it can be read "as is" back into your editor or word processor. Spreadsheet or graphics files must usually be recovered whole for the program to read them successfully. If you partially recover an overwritten file and the program that created it cannot load it, there is very little you can do unless File Fix can repair it. See "Repairing Data Files with File Fix" in Chapter 3, "Recovery Tutorials," for more information.

Because you can access any cluster on your disk with Disk Editor, it is extremely effective in recovering overwritten files. You can even recover data from partially overwritten clusters since Disk Editor can edit the sectors that make up the clusters.

NOTE: Attempt to recover overwritten files with UnErase first. The UnErase manual recovery mode is specifically designed to recover partially overwritten files. See "Recovering Erased Files with UnErase" in Chapter 3, "Recovery Tutorials," for complete information.

Recovering an overwritten file with Disk Editor consists of two basic steps for each file you want to recover:

- Finding the starting cluster of the file.
- Finding the rest of the file.

Finding the Starting Cluster

The first thing you need to do is find the starting cluster of the overwritten file. This gives you a starting point from where you can locate the rest of the clusters of the file.

To locate the starting cluster of the file:

1. Label a piece of paper "Overwritten Files" and write the name of the file that you want to recover.

   When you find the first cluster, record the cluster number on "Overwritten Files" next to the filename and mark it as the starting cluster.

2. Start Disk Editor.

3. Choose DRIVE... from the Object menu.

   If the disk with the overwritten file is a floppy disk, insert it into the appropriate floppy drive.

4. Select the drive that contains the overwritten file from the Select the Disk You Wish to Edit dialog box, then select OK.

5. Choose CLUSTER... from the Object menu.

   The Select Cluster Range dialog box appears.

6. Enter 2 in the Starting Cluster text box.

7. Enter the number of the last cluster on the drive into the Ending Cluster text box and select OK.

   The cluster number is identified by the message "Valid cluster numbers are 2 through xxxx," where "xxxx" represents the last cluster number on the current drive.

8. Choose FIND... from the Tools menu.

   The Enter Search Text dialog box appears.

9. In the ASCII text box enter a unique string that appears at the beginning of the file and select Find.

   For example, if you are looking for a word processor file with the title page "Year End Report," type the string "Year End Report" in the text box. You can use part of the string such as "Year End" or just "Report."

When Disk Editor finds the string, it highlights it and displays it in Hex view. If you're trying to recover a text file, choose AS TEXT from the View menu to switch to Text view for easier reading.

If the cluster containing the string appears to be the first in the file:

1 Record the cluster's number next to the filename on your piece of paper and mark it as the starting cluster.

2 Skip to the "Finding the Rest of the File" section later in this appendix.

To verify that this cluster does not belong to any other file, look at the Disk Editor status line at the bottom of the screen. When a cluster belongs to a file, the filename appears at the left side of the status line. For free clusters, the filename is omitted.

If the cluster that contains the string belongs to the overwritten file, but is not the first cluster:

1 Record the cluster number on the piece of paper but do not mark it as the starting cluster.

2 Begin a new search for strings that may appear earlier in the file by returning to step 9 above.

Or,

Browse previous clusters manually using the UpArrow or PageUp key.

If you locate the starting cluster by browsing, record the cluster number and find the rest of the file as described in the next section.

If the cluster doesn't belong to the file you're trying to recover:

1 Choose FIND AGAIN from the Tools menu.

If Disk Editor finds the search string, check to see if it belongs to the first cluster of the file. Record the cluster number on "Overwritten Files" if it does.

2 Repeat the previous step until you find the first cluster of your file or you reach the end of the disk.

If you haven't found any clusters from your file:

- Choose FIND... from the Tools menu and enter a different search string.

NOTE: The file you are attempting to recover may have been partially overwritten at the beginning of its data area. If so, you may never find the text strings that were once there. If you do not find any strings from the beginning, search for strings that appear in different areas of the file. Begin searching for strings from the beginning and work to strings that appear at the end of the file.

Finding the Rest of the File

Unless the disk is very fragmented, the rest of the clusters of the file should be near and after the starting cluster. If you cannot locate the rest of the file near the starting cluster, you must search for text that appeared somewhere after the starting cluster.

For this procedure, you need to calculate the number of clusters the overwritten file initially contained. To do this, you need to estimate the approximate size of the overwritten file in bytes. Don't be concerned if you cannot remember the exact size.

To calculate the number of clusters the file contained:

1. Choose DRIVE INFO... from the Info menu.

   The Drive Info dialog box appears.

2. Record the values indicated by the "Bytes per sector" and "Sectors per cluster" labels and multiply them. The result is the size of the cluster, in bytes.

3. Estimate the size of the overwritten file in kilobytes.

   Don't worry if you cannot remember the exact size; approximate as close as you can.

4. Convert this value to bytes by multiplying the kilobyte value by 1024.

5. Divide the number of bytes by the cluster size in bytes.

6 Round off the resulting value and you have the approximate number of clusters for the overwritten file.

Once you know how many clusters you need for the file, you can find the clusters using one of the two methods described below.

Under most circumstances, you should be able to locate the rest of the file close to the starting cluster. Use the following procedure.

Method 1—To look near the starting cluster:

1 Select CLUSTER... from the Object menu.

The Select Cluster Range dialog box appears.

2 Enter the starting cluster number of the file you want to recover into the Starting Cluster text box and select OK.

3 Choose AS HEX from the View menu.

4 Inspect the data in each cluster.

Remember that the first cluster you see is the starting cluster of the overwritten file. You should be able to get some idea of what should come in the following clusters in the file.

5 Browse through the next several clusters with the PageDown and DownArrow keys, looking for data that you expect after the starting cluster.

6 If you find the cluster, record its number on your "Overwritten Files" list next to the filename to which the cluster belongs.

Make certain that each cluster you add has not already been allocated to another file by checking the Disk Editor status line.

7 Repeat steps 5 and 6, using the data in the newest cluster found to guess what should be in the next cluster, until you have found the proper number of clusters for the original file.

If you cannot find the next cluster by browsing, skip to the next procedure.

If you fail to find any portion of the file, try searching clusters by their contents near the starting cluster, as described in the procedure below.

Method 2—To search for unique text in the next cluster:

1. Press the Home key once to return to the starting cluster of the selected object, which is also the starting cluster of the overwritten file.
2. Choose FIND... from the Tools menu.

   The Enter Search Text dialog box appears.
3. Enter text you know appears frequently in this file, but not in other files, in the ASCII text box, then select OK.
4. When the search string is found, record the cluster number that contains the search string, if it belongs to the overwritten file, on your "Overwritten Files" list.

   Or,

   If no clusters are found, choose FIND... from the File menu and search for a new string.
5. Start a search for text you expect to be in the next cluster by choosing FIND... from the File menu and entering the new search text.

   Or,

   Manually browse the next several clusters for the next cluster in the file using the DownArrow and PageDown keys.
6. If the next expected cluster is found, record the cluster number on your "Overwritten Files" list.
7. Continue searching for strings or browsing until you find the expected number or clusters.

If you could not find any clusters using this method, the file was most likely completely overwritten. In this case, you cannot recover the data.

Writing the Clusters to a File

Now that you have the original clusters of the overwritten file, you need to combine them and write them into a single file on disk.

To write the file to disk:

1. Select the first cluster of the file as your object, using your "Overwritten Files" list of found clusters:
   a. Choose CLUSTER... from the Object menu.

      The Select Cluster Range dialog box appears.

   b. Enter the starting cluster number into both the Starting Cluster and Ending Cluster text boxes and select OK.
2. Choose WRITE OBJECT TO... from the Tools menu.

   The Write dialog box appears.
3. Select To a File then select OK.

   The Save dialog box appears.
4. Enter a filename on a different drive and select OK. For example, you could enter `b:myfile.wk1`.

WARNING: Do not save this file to the drive containing the clusters of the overwritten file. You may overwrite the very clusters you are trying to recover.

5. Select the next cluster of the file from your "Overwritten Files" list.
6. Choose WRITE OBJECT TO... from the Tools menu.

   The Write dialog box appears
7. Select To a File then select OK.

   The Save dialog box appears.
8. Type in the same filename as in step 4 and select OK.
9. Choose Append to add your cluster to that file when the message box prompts you.
10. Repeat steps 6 through 9 until you append all the clusters to the file.

If you have recovered a file that can be repaired with File Fix, check your file's integrity with it. See "Repairing Data Files with File Fix" in Chapter 3, "Recovery Tutorials," for more information.

Recovering Cross-Linked Files

When two or more (usually only two) files are cross-linked, they are sharing the same cluster or chain of clusters. The cross-linkage can take place anywhere along the cluster chain, not just on the first or last cluster.

Since each cluster can only belong to one file at a time, one of the cross-linked files is unusable until you eliminate the cross-linkage. Furthermore, one of the cross-linked files is almost always the real owner of the cross-linked clusters. You can usually recover the missing clusters for the other file as lost clusters and re-link them into the correct file.

Norton Disk Doctor detects and repairs cross-linked files. You can also fix cross-linked files using the following procedure if Norton Disk Doctor cannot fix them, or if you want complete control over the recovery process.

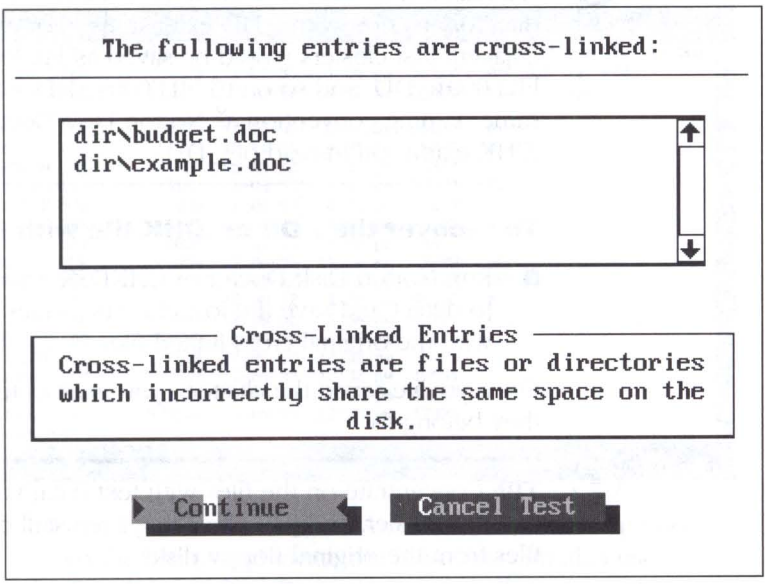
The following recovery procedure uses Disk Editor, Norton Disk Doctor, and the DOS CHKDSK program. If you are not familiar with these programs, see the "Tools of the Trade" section at the beginning of this appendix.

First, you need to identify the files that are cross-linked and the clusters they are cross-linked on.

To identify the cross-linked files:

1. Run Norton Disk Doctor or CHKDSK to locate the cross-linked files and the clusters they are cross-linked on.
2. Record the names of the cross-linked files and the cluster number or numbers they are cross-linked on (see Figure B-3).

Figure B-3 Cross-linked files detected by Norton Disk Doctor



3 Copy the cross-linked files to another disk using the DOS COPY command.

   If a certain file is too big you can copy it to another directory, though this is not preferred. If you do not have another disk with enough room to hold the files, create a new subdirectory in the root directory and copy them into this subdirectory.

4 Verify whether each file you copied is corrupt by loading it if it's a data file, or running it if it's a program file. Be sure to verify the copies in the new disk or directory, not the originals.

5 Make a list of the corrupt files on a piece of paper labeled "Corrupt Files."

6 Copy the good files back to the same directory of the original disk.

At this point, these files should be free of cross-linkages and should load or run correctly. Next, you need to recover the lost clusters so you can link them back to the corrupted files they belong to.

NOTE: Norton Disk Doctor saves lost clusters to the root directory as files with ._DD extensions. For example, five non-adjacent lost clusters would be saved as FILE0000._DD, FILE0001._DD, and so on to FILE0004._DD. CHKDSK uses the same naming convention as Norton Disk Doctor, but uses the .CHK extension instead of ._DD.

To recover the ._DD or .CHK file with Disk Editor:

- Run Norton Disk Doctor or CHKDSK with the /F switch to detect and save the lost clusters as files on the disk with the original cross-linked files.

Once you've saved the clusters, you must determine which files they belong to.

TIP: Concentrate on the files with text data; you can recognize text data easier, and you can always reinstall corrupted program files from the original floppy disks.

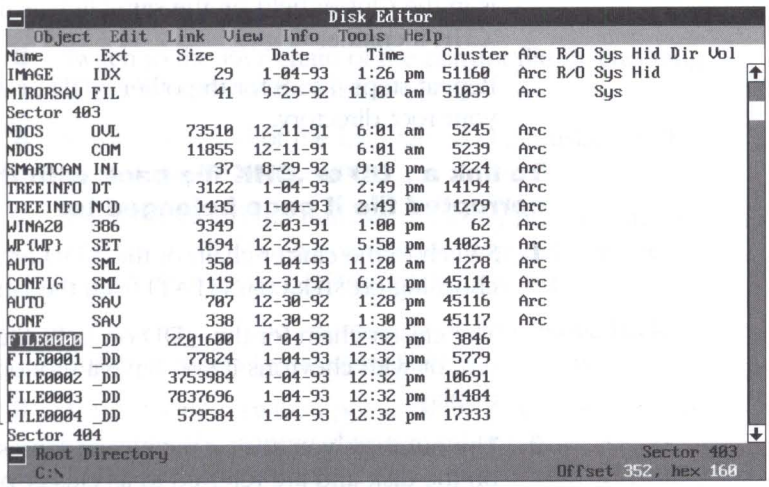
To examine the clusters to see where they belong:

1. Start Disk Editor.
2. Choose DRIVE... from the Object menu.

   The Select the Disk You Wish to Edit dialog box appears.
3. Select the disk that contains the ._DD or .CHK files using the UpArrow and DownArrow keys, then select OK.

   The root directory of the disk is displayed in Directory view, as shown in Figure B-4. You may not immediately see the ._DD or .CHK in the directory listing.

Figure B-4 The root directory in directory view



Lost clusters

4 Use the UpArrow and DownArrow keys to scroll up and down the listing and locate the files. You can also use the PageUp and PageDown keys to scroll a screen at a time.

5 Highlight a ._DD or .CHK file and press Enter.

The contents of the file appear in Hex view.

6 Choose AS TEXT from the View menu to switch to Text view for easier reading.

7 If you cannot discern which corrupted file this data belongs to, skip the ._DD or .CHK file and select another one.

Or,

If you know which corrupted file the data belongs to, return to the root directory by choosing DIRECTORY from the Link menu.

8 Record the starting cluster number of the ._DD or .CHK file you just determined to belong in your corrupted file on a piece of paper labeled "._DD or .CHK Files."

Identify the ._DD or .CHK filename for each starting cluster number.

The starting cluster number for each ._DD or .CHK file is in the Cluster field on the same line as the ._DD or .CHK filename.

Repeat steps 4 to 8 for the other ._DD or .CHK files in your root directory.

To link a ._DD or .CHK file back with the corrupted file it once belonged to:

1 Switch to the cluster chain of the ._DD or .CHK file by choosing CLUSTER CHAIN (FAT) from the Link menu.

The cluster chain for the ._DD or .CHK file is marked in red, or with chevrons if you have a monochrome display.

2 The numbers you see on the screen represent clusters on the disk and are referred to as cluster positions. Count each number, including the <EOF> marker, and record this value next to the starting cluster number for this file on your "._DD or .CHK Files" list (see Figure B-5).

Figure B-5 The FAT chain

Disk Editor

Object Edit Link View Info Tools Help

65	66	<EOF>	<EOF>	69	<EOF>	953	72
73	74	75	76	77	78	79	<EOF>
81	82	<EOF>	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	<EOF>	101	102	103	104
105	106	107	<EOF>	109	110	111	112
113	114	115	116	117	118	119	120
121	122	123	124	<EOF>	126	127	128
<EOF>	130	131	132	133	134	135	136
<EOF>	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152
153	154	155	156	157	158	159	160
161	162	163	164	165	<EOF>	167	168
169	170	171	<EOF>	173	174	175	176
177	178	179	180	181	182	183	<EOF>
185	186	187	188	189	<EOF>	191	192
193	194	<EOF>	196	197	198	199	200
201	202	203	204	205	<EOF>	207	208
209	210	211	212	<EOF>	214	215	216
217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232

Sector 18 of 285,887 Cyl 0, Side 1, Sector 2
Hard Disk 1 Cluster 449, hex 1C1

3 Return to Directory view by choosing AS DIRECTORY from the View menu.

4 Highlight the corrupted file to which the ._DD or ._CHK file belongs and select OK.

5 Switch to the FAT chain of the corrupt file by choosing AS FAT from the View menu.

6 Move to the end of the highlighted chain using the Tab key for every cluster number.

7 Move backward the number of cluster numbers in the ._DD or .CHK file you counted in step 2 above and recorded on your "._DD or .CHK Files" list.

   For example, if you counted 20 clusters, move back 20 cluster numbers by pressing Shift+Tab 20 times.

8 At this location (which points to the next cluster in the file), enter the starting cluster number of the ._DD or .CHK file you recorded in step 2 above, also on your "._DD or .CHK Files" list.

9 Change every remaining cluster to the <EOF> symbol by highlighting each cluster and typing E.

   Start with the cluster immediately to the right of the current one, which now points to the beginning of the ._DD or .CHK file, and work your way down until you encounter the first <EOF> marker.

10 Choose WRITE CHANGES from the Edit menu.

   The Write Changes dialog box appears.

11 Select OK.

   The Rescan dialog box appears.

12 Select OK to rescan the disk.

Now you should erase the ._DD or .CHK file to free up the re-linked clusters. Otherwise you will still have cross-linked clusters between the ._DD or .CHK file and the file that is the true owner of the clusters.

To erase the ._DD or .CHK file:

1 Choose DIRECTORY... from the Object menu.

   The Change Directory dialog box appears.

2. Highlight the root directory in the directory tree using the UpArrow and DownArrow keys, then select OK to select the root directory.
3. Highlight the ._DD or .CHK file the clusters of which have been re-linked.
4. Place the cursor under the F of its filename using the LeftArrow and RightArrow keys.
5. Press Alt+F5 to manually erase the file, replacing the first letter with the DOS sigma character (σ).
6. Choose WRITE CHANGES... from the Edit menu.

   The Write Changes dialog box appears.
7. Select OK.
8. Choose Exit from the Object menu to exit Disk Editor.

The files should now be fully recovered. Run Norton Disk Doctor to validate the corrections you made.

Lifting Data from a Bad Disk

A bad disk cannot be accessed by DOS, the disk controller, or even Norton Disk Doctor. However, Disk Editor can access most bad disks and lets you "lift" the data they contain.

There are two classes of bad disk problems: logical and physical. Logical problems involve write errors that result in scrambled data on the disk. Fortunately, Norton Disk Doctor automatically fixes most of these problems for you.

Physical problems usually involve physically damaged sectors in the partition table, boot record, the first copy of the file allocation table (FAT), or any combination of these system areas.

When sectors in the system areas become physically damaged, DOS cannot access the disk normally. Since even Norton Disk Doctor usually cannot repair physically damaged sectors, you may never gain normal access to the disk unless you perform a low-level format. However, traditional low-level formatters for older hard disks destroy the existing data and non-destructive formatters such as Calibrate do not work with today's sector-translating IDE, SCSI, and ESDI hard drives.

Even if DOS cannot access your disk properly, Disk Editor can lift data around the damaged areas, cluster by cluster, file by file. This way, you can recover critical data files that you have not backed up and cannot afford to do without.

NOTE: Reinstall any program files from their original disks rather than trying to recover them from a bad hard disk with Disk Editor.

Fixing a Bad Floppy Disk

Often, you can repair a bad floppy disk by copying it with the DOS DISKCOPY program. If DISKCOPY is unsuccessful, run the Disk Tools Revive a Defective Diskette procedure as a last resort.

NOTE: For the DISKCOPY routine, you need a blank floppy disk of the same size and capacity as the bad floppy disk.

To copy the bad disk with DISKCOPY:

1. Insert the bad disk into the appropriate floppy drive.
2. At the DOS prompt, type `diskcopy s: d:` where s: is the drive where the bad floppy disk resides and d: is the destination drive.

   Usually, the source and destination drivers are the same. For example, `diskcopy a: a:` copies one floppy disk to another in the A: drive by swapping the original and the duplicate as required.
3. Follow the instructions provided by DISKCOPY as it performs the copy.
4. Check the copy with Norton Disk Doctor.

To revive a defective floppy disk with Disk Tools:

1. Type `DISKTOOL` at the DOS prompt.

   The Disk Tools menu appears.
2. Select Revive a Defective Diskette then select Proceed.

   The Select Drive to Revive dialog box appears.

3 Select the floppy drive with the bad disk then select OK to begin the procedure.

During the procedure, Disk Tools displays a dialog box that shows the progress of the revival.

4 Check the disk with Norton Disk Doctor to verify it is has been revived.

Manually Recovering Hard and Floppy Disks

Disk Editor classifies a disk as either a Logical or a Physical disk. Logical disks have system areas such as the boot record, FATs, and root directory. Disk Editor treats them as regular DOS disks. Furthermore, Disk Editor uses a cluster, usually composed of four or more sectors, as the smallest data allocation unit, which makes performing manual recovery procedures easier.

Physical disks have no system areas or clusters. The entire disk is composed of sectors addressed by cylinder, side, and sector numbers, which makes manual recovery extremely difficult and rarely successful. Disk Editor automatically treats severely damaged disks as Physical disks since it cannot access the system areas properly.

If a disk cannot be automatically accessed as a Logical disk, edit its physical and logical parameters to treat it as a Logical disk. By treating a damaged disk as a Logical disk, you can deal with clusters rather than sectors.

First you need to determine if Disk Editor is accessing your damaged disk as a Logical or Physical disk. If Disk Editor is accessing the disk as a Physical disk, you need to use edit the disk's logical parameters and treat it as a Logical disk.

To determine a Logical or Physical disk:

1 If your C: drive is damaged and your computer can't start from it, start from your A: drive with a bootable DOS system disk. See the "Tools of the Trade" section at the beginning of this appendix for details.

2 Start Disk Editor.

3 Choose DRIVE... from the Object menu.

The Select the Disk You Wish to Edit dialog box appears.

4 Select Logical Disks from the Type group box.

If the bad disk can be accessed as a Logical disk, you should see the disk listed in the drives list box. Go to "Lifting Data from a Logical Disk" later in this appendix.

If the bad disk isn't listed in the drives list box, continue with the next section, "Treating a Physical Disk as a Logical Disk."

Treating a Physical Disk as a Logical Disk

Disk Editor estimates the correct values of your disk's physical and logical parameters. The number of sides, cylinders, sectors, and so on are automatically inserted into the appropriate fields of the Advanced Recovery Mode dialog box and used to treat the disk as a Logical disk.

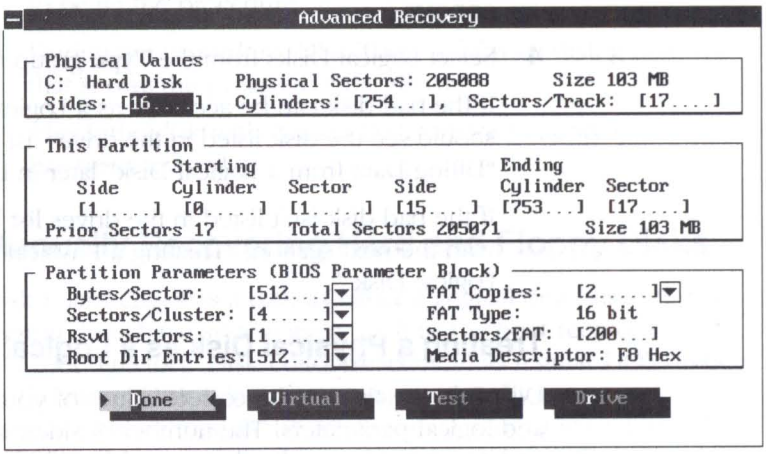
If the disk's parameters are incorrect, the resulting Logical disk may have structural problems. If you consistently run into problems accessing the disk, re-enter the disk's physical and logical parameters into the Advanced Recovery Mode dialog box. For example, if you select the first copy of the FAT but do not see it, the number of total sectors may be incorrect.

To treat the disk as a Logical disk:

1 Choose ADVANCED RECOVERY MODE... from the Tools menu.

The Advanced Recovery dialog box appears as shown in Figure B-6.

Figure B-6 The Advanced Recovery dialog box


Advanced Recovery
Physical Values
C: Hard Disk Physical Sectors: 205088 Size 103 MB
Sides: [16....], Cylinders: [754...], Sectors/Track: [17....]
This Partition
Starting Ending
Side Cylinder Sector Side Cylinder Sector
[1.....] [0.....] [1.....] [15....] [753...] [17....]
Prior Sectors 17 Total Sectors 205071 Size 103 MB
Partition Parameters (BIOS Parameter Block)
Bytes/Sector: [512...] FAT Copies: [2.....]
Sectors/Cluster: [4.....] FAT Type: 16 bit
Rsvd Sectors: [1.....] Sectors/FAT: [200...]
Root Dir Entries:[512...] Media Descriptor: F8 Hex
Done
Virtual
Test
Drive

2 Select the Drive button.

The Select the Disk You Wish to Review dialog box appears.

3 Select the bad disk, then select OK.

The Advanced Recovery Mode dialog box reappears.

4 Select the Virtual command button.

Disk Editor rescans the disk as a Logical disk. When complete, you should see the root directory of the disk in Directory view.

For detailed information on the advanced recovery mode, see Chapter 9, "Disk Editor (DISKEDIT)."

Lifting Data from a Logical Disk

If Disk Editor can access your bad disk as a Logical disk directly or by using Advanced Recovery Mode, use the following procedure. To a recover file, you need to find, select, and write it out to another disk.

To locate the directory that contains the file you want to recover:

1 Choose DIRECTORY... from the Object menu.

The Change Directory dialog box appears.

2 Select the directory that contains the file you want to recover, then select OK.

The directory listing appears in Directory view.

3 Find the file in the directory listing.

If it exists, you can write the file out as described in the next procedure. If the file does not exist in this directory, try looking in other directories.

To write the file out:

1 Select the filename of the file you want to recover then press Enter.

The contents of the file appear in Hex view.

2 Choose WRITE OBJECT TO... from the Tools menu.

The Write dialog box appears.

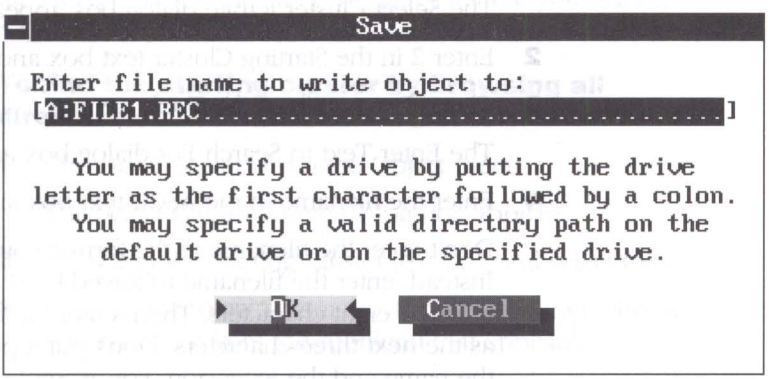
3 Select To a File then select OK.

The Save dialog box appears.

TIP: Write the file out to a floppy disk in the A: or the B: floppy drive.

4 Enter a drive letter followed by a filename in the text box and select OK, as in Figure B-7.

Figure B-7 A file to write out


Save
Enter file name to write object to:
[A:FILE1.REC]
You may specify a drive by putting the drive letter as the first character followed by a colon.
You may specify a valid directory path on the default drive or on the specified drive.
OK
Cancel

5 A confirmation box appears asking if you want to write the file out. Select Yes.

The "Copying..." progress box appears for the duration of the copy function.

Perform steps 1 to 5 for each of the files you want to recover. Return to the preceding procedure to locate other directories with the files you want to recover.

Lifting Clusters from a Physical Disk

When Disk Editor cannot access the disk as a Logical disk, you can still lift individual clusters, starting with the first cluster of the file. This is possible since the Virtualize command button in the Advanced Recovery Mode dialog box allows Disk Editor to work with clusters instead of sectors.

There are three methods to locate the first cluster of file. Try method one first, then method two, and finally method three.

Method One: Finding the Starting Cluster by Filename

When the directory structure of a disk is still intact, you can find the starting cluster number by searching the disk for the directory entry for the file, which contains the cluster number.

To find the starting cluster by searching for the filename:

1 Choose CLUSTER... from the Object menu.

The Select Cluster Range dialog box appears.

2 Enter 2 in the Starting Cluster text box and select OK.

3 Choose FIND... from the Tools menu.

The Enter Text to Search For dialog box appears.

4 Enter the filename in the ASCII text box and select Find.

Don't enter the filename in the format you're used to. Instead, enter the filename followed by enough spaces to make eight characters. Then, enter the file extension as the next three characters. Don't put a period between the name and the extension. For example, enter NAME.EXT as NAME EXT.

The Search Progress dialog box appears. When Disk Editor finds the search string, it highlights the string and displays it in Hex view.

5 Choose AS DIRECTORY from the View menu to switch to Directory view.

6 If the display is a directory, record the filename, starting cluster number, and the file size of the file from those fields on a piece of paper labeled "Files To Recover."

Or,

If there are unrecognizable characters such as happy faces, hearts, and other non-standard characters, search for another occurrence of the filename by choosing FIND AGAIN from the Tools menu.

Find and record the starting cluster numbers and file sizes for all the files you want to recover. Then, find the rest of the clusters for each file as described in "Finding the Rest of the Clusters" below.

Method Two: Finding the Starting Cluster by Browsing All Directories

You can locate the file you want to recover by browsing through all directories on the disk. To locate all directories on the disk except the root directory, search for ".. " (two periods followed by six spaces), since every directory other than the root has ".. " as its second entry. As you find each directory, scan the directory listing for the file you want to recover.

To find the starting cluster by browsing all directories:

1 Choose CLUSTER... from the Object menu.

The Select Cluster Range dialog box appears.

2 Enter 2 in the Starting Cluster text box and select OK.

3 Choose FIND OBJECT from the Tools menu, then choose SUBDIRECTORY from the submenu that appears.

The Search Progress dialog box appears.

4 Once the search completes, choose AS DIRECTORY from the View menu to switch to Directory view.

5 If the display is a directory and the file you want to recover is listed, record the name, starting cluster number, and size of that file on a piece paper labeled "Files To Recover."

Or,

If the display is not a directory or you cannot locate the file you want to recover, choose FIND AGAIN from the Tools menu to continue searching for more subdirectories.

If this method is unsuccessful, try method three below, which searches for a unique text string that appears in the starting cluster of the file.

Method Three: Searching for Unique Text in the File

When the directory structure is damaged, the best way to find the starting cluster is to search for embedded text in the starting cluster.

TIP: This method works best for text files such as word processing files.

To search for unique text in the file:

1 Choose CLUSTER... from the Object menu.

The Select Cluster Range dialog box appears.

2 Enter 2 in the Starting Cluster text box and select OK.

3 Choose FIND... from the Tools menu.

The Enter Text to Search For dialog box appears.

4 Enter a unique string that appears at the beginning of the file in the ASCII text box and select Find to begin the search.

For example, if you are looking for a word processor file with the title page "Year End Report," enter the string "Year End Report" in the text box.

Disk Editor displays the search string in Hex view.

5 Choose AS TEXT from the View menu to switch to Text view.

6 If the cluster that contains the string appears to be the first cluster in the file, record the starting cluster's number and a unique name for the file on a piece of paper labeled "Files To Recover." Mark it as the starting cluster.

Or,

If the cluster that contains the string belongs to the file, but does not appear to be the first cluster, record the cluster number on the same piece of paper next to the unique name, but do not mark it as the starting cluster.

Or,

If the cluster with the search string does not belong to the file you're looking for, choose FIND AGAIN from the Tools menu to continue the search.

If you haven't found any clusters from your file, try searching for a different text string.

Finding the Rest of the Clusters

Now that you have found the starting cluster, you need to find the rest of the clusters in the file. If you found the starting cluster, the filename, and the file size using the first or second method in the preceding section, use method one of this section. Otherwise, use method two of this section.

Method One: Finding the Rest of the Clusters with the File Size

With the file size, you can calculate the number of clusters the file contained. Then you can locate and record the individual clusters which you will later write out to a file.

To calculate the number of clusters the file contained:

1 Choose DRIVE INFO... from the Info menu.

The Drive Info dialog box appears.

2 Multiply the values for Bytes Per Sector and Sectors Per Cluster.

   The result is the size of each cluster in bytes.

3 Divide the file size by the cluster size.

4 Round off the value to the next integer value.

   For example, if the file size is 100,000 bytes and your disk's cluster size is 8196 bytes, the file has thirteen clusters (12.2 rounded off to 13).

To determine which clusters belong to the file you want to recover, you need to browse the FAT. To browse the FAT, you need to find it.

Once you find the FAT, locate the starting cluster. Then, pinpoint the individual clusters located to the right of and below the starting cluster until the <EOF> marker that indicates the end of the file.

To find the FAT:

1 Choose PHYSICAL SECTOR... from the Object menu.

   The Select Physical Sector Range dialog box appears.

2 Select OK to select entire disk as the object.

3 Choose FIND OBJECT from the Tools menu, then choose FAT from the submenu that appears.

4 Choose AS FAT from the View menu when Disk Editor finds the signature.

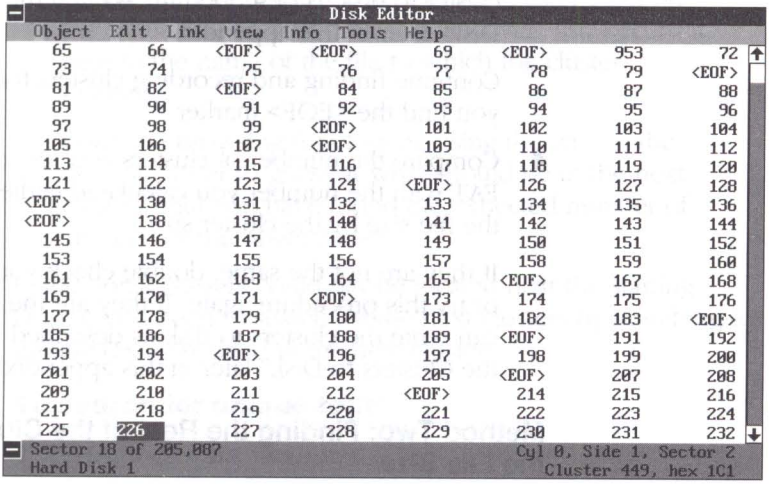
   If the Disk Editor screen resembles Figure B-8, you have found the FAT and you can locate the clusters that belonged to the file as described in the following procedure.

   Or,

   If the Disk Editor screen doesn't resemble Figure B-8, choose FIND AGAIN from the Tools menu to continue searching for the FAT.

If you cannot find the FAT or it is very corrupted, try method two of this section to find the rest of the clusters.

Figure B-8 Disk Editor in FAT view



To locate the clusters that belonged to the file:

1 Use the PageDown and Tab keys until the Cluster label on the status line matches the starting cluster number of the file you want to recover.

When you find the starting cluster, its position on the screen (not Disk Editor's status line) should display <EOF>, which marks the last cluster in file, or the number for the next cluster.

If it is marked <EOF>, you have found the first and last cluster of the file. You can write the cluster to disk as described below.

2 If it has the cluster number of the next cluster in the file, use the PageDown and Tab keys to move to that cluster and highlight it.

Remember to use the Cluster label on the status line as the cluster number reference.

3 Record the number indicated by the Cluster label on the status line next to the filename on your "Files To Recover" list.

Unless the file is composed of multiple cluster chains, the next cluster is usually immediately to the right of the current cluster. If this cluster position is marked with

<EOF>, it is the last cluster of the file. You can write the cluster to disk as described in "Writing the Clusters to Disk" later in this appendix.

Continue finding and recording clusters for the file until you find the <EOF> marker.

4 Compare the number of clusters you recorded from the FAT with the number you calculated earlier (by dividing the file size by the cluster size.)

If they are not the same, double check your calculations or try this procedure again. If they are the same, you can write the clusters to disk as described in "Writing the Clusters to Disk" later in this appendix.

Method Two: Finding the Rest of the Clusters Without the File Size

Unless the disk is very fragmented, the rest of clusters of the file should be near and after the starting cluster. Locate the rest of the file by browsing near the starting cluster, or search for text that appeared somewhere after the starting cluster.

NOTE: This procedure works best for text files only.

To browse the adjacent clusters:

1 Select CLUSTER from the Object menu.

The Select Cluster Range dialog box appears.

2 Enter the starting cluster number from your "Files To Recover" list in the Starting Cluster text box and select OK.

Disk Editor displays the contents of the starting cluster in Hex view.

3 Choose AS TEXT from the View menu.

4 Scroll to the next cluster using the PageDown and DownArrow keys.

The cluster markers on the screen (not on the status line) differentiate cluster numbers.

5 When you find a cluster belonging to the file, record the cluster number displayed next to the Cluster label on the status line on your "Files To Recover" list. Record it next to the name of the file to which the cluster belongs.

Continue browsing for clusters, using the data in the newest cluster to guess at what should be in the next cluster, until you have found the expected number of clusters for the original file.

If additional clusters could not be located near the starting cluster, you need to search for the next clusters by searching for unique text contained in the next clusters.

To search for unique text:

1 Press the Home key once.

Disk Editor returns to the starting cluster

2 Choose FIND... from the Tools menu.

The Enter Search Text dialog box appears.

3 Enter the text to search for in the ASCII text box and select Find to begin the search.

4 When the search string is found, record the cluster number that contains the search string if it belongs to the overwritten file on your "Files To Recover" list. Record it next to the name of the file to which the cluster belongs.

5 Start a new search for text you expect to be in the next cluster.

Or,

Manually browse the next several clusters for the next cluster using the PageDown and DownArrow keys.

6 If no clusters are found, choose FIND... from the tools menu and enter a new search string.

Continue searching and browsing until you have reached the expected end of the file.

Writing the Clusters to Disk

The final step is to combine the clusters you have found into a single, usable file on a floppy disk.

To write the file out:

1. Choose CLUSTER... from the Object menu.

   The Select Cluster Range dialog box appears.

2. Enter the starting cluster number of the first filename from your "Files To Recover" list into both the Starting Cluster and Ending Cluster text boxes. Select OK.

3. Choose WRITE OBJECT TO... from the Tools menu.

   The Write dialog box appears.

4. Select To a File then select OK.

   The Save dialog box appears.

5. Insert a blank floppy disk into either the A: or B: drive.

6. Enter the drive letter of the drive that contains the blank floppy disk, followed by a filename for the file created with the clusters you have found (for example, enter A:MYFILE.DOC). Select OK.

   A confirmation box appears asking if you want to write the file out.

7. Select Yes.

   The write progress screen appears for the duration of the write operation.

8. Choose CLUSTER... from the Object menu.

   The Select Cluster Range dialog box appears.

9. Enter the next cluster number from your "Files To Recover" list into both the Starting Cluster and Ending Cluster text boxes and select OK.

10. Choose WRITE OBJECT TO... from the Tools menu.

    The Write dialog box appears.

11. Select To a File then select OK.

    The Save dialog box appears.

12 Enter the same filename you entered in step 6 and select OK.

A message box appears, telling you the file already exists.

13 Choose the Append command button.

A confirmation box appears asking you if you want to write the file.

14 Select Yes.

15 Repeat steps 8 to 14 to append all the clusters.

If the file you recovered is supported by File Fix, use it to check your file's integrity. See "Repairing Data Files with File Fix" in Chapter 3, "Recovery Tutorials," for more information.

Recovering from DOS RECOVER

The DOS RECOVER program can help you recover files after a partial format or after the root directory has been destroyed. RECOVER simply creates an entry in the root directory for every chain in the FAT (every file), destroying the previous root directory and the filenames. If you can't access any of your files, the DOS RECOVER program gives you all of your files, and lets you decide which is which.

Norton Disk Doctor and UnFormat fix the problems RECOVER was designed to address more effectively. See Chapter 3, "Recovery Tutorials," for more information on these utilities.

If you have already run RECOVER, your files are still intact. The FAT has not been changed. The only change is that the root directory has been replaced. You can use the Disk Tools Recover from DOS's Recover procedure to return your disk to the state it was in before you ran RECOVER.

To recover from DOS RECOVER with Disk Tools:

1 Insert the Norton Utilities Emergency Disk into the A: or B: floppy drive.

2 Switch to the drive containing the Norton Utilities Emergency Disk by typing `A:` (or `B:`).

3 At the DOS prompt, type DISKTOOL.

The Disk Tools menu appears.

4 Select Recover from DOS's RECOVER then select Proceed.

The Recover from DOS's Recover dialog box appears.

5 Select OK.

The Select Disk to Recover from DOS's Recover dialog box appears.

6 Select the appropriate drive then select OK.

A warning box appears and prompts you to confirm the recovery action.

7 Select OK to begin the recovery procedure.

8 Use Norton Disk Doctor to check the drive you just recovered.

Fixing a Damaged Root Directory

When your root directory appears to be damaged, your disk may have bad root directory entries. You can restore the root directory to the state it was in by creating new entries for the files and subdirectories.

Locating Root Level Directories

First, locate all the root level directories by searching for ".. " (two periods followed by six spaces). A root level directory is a directory off the root directory. Record the starting cluster numbers for each root level directory on a piece of paper labeled "Starting Cluster Numbers."

To locate root level directories:

1 Start Disk Editor.

2 Choose DRIVE... from the Object menu.

The Select the Disk You Wish to Edit dialog box appears.

3 Select the drive with the damaged root directory then select OK.

4 Choose CLUSTER... from the Object menu.

The Select Cluster Range dialog box appears.

5 Enter 2 in the Starting Cluster text box and select OK.

6 Choose FIND OBJECT from the Tools menu, then choose SUBDIRECTORY from the submenu that appears.

7 Choose AS DIRECTORY from the View menu when Disk Editor finds the search string.

8 If the screen does not resemble a directory listing, continue the search.

Or,

If the screen does resemble a directory listing, check to see if the ".." entry, which is always second, displays 0 in the Cluster field. If so, then the current directory is a root level directory. Record the cluster number on the status line in the lower-right corner of the screen, and verify that it matches the value in the Cluster field for the "." entry above the ".." entry.

Figure B-9 shows an example of the "." and ".." entries for a root level directory.

Figure B-9 Disk Editor in Directory view

```
                              Disk Editor
  Object  Edit  Link  View  Info  Tools  Help
Name      .Ext      Size      Date      Time     Cluster Arc R/O Sys Hid Dir Vol
Cluster 68, Sector 697
.                        0   3-25-92  11:53 am      68                     Dir
..                       0   3-25-92  11:53 am       0                     Dir
COUNTRY   SYS        17069   2-03-91   1:00 pm      71   Arc
EGA       SYS         4885   2-03-91   1:00 pm      80   Arc
FORMAT    COM        32911   2-03-91   1:00 pm      83   Arc
KEYB      COM        14986   2-03-91   1:00 pm     100   Arc
KEYBOARD  SYS        34697   2-03-91   1:00 pm     108   Arc
NLSFUNC   EXE         7052   2-03-91   1:00 pm     125   Arc
DISPLAY   SYS        15792   2-03-91   1:00 pm     129   Arc
EGA       CPI        58873   2-03-91   1:00 pm     137   Arc
HIMEM     SYS        11552   2-03-91   1:00 pm     166   Arc
MODE      COM        23537   2-03-91   1:00 pm     172   Arc
SETVER    EXE        12007   2-03-91   1:00 pm     184   Arc
ANSI      SYS         9029   2-03-91   1:00 pm     190   Arc
DEBUG     EXE        20634   2-03-91   1:00 pm     195   Arc
EDLIN     EXE        12642   2-03-91   1:00 pm     206   Arc
Cluster 68, Sector 698
EMM386    EXE        91742   2-03-91   1:00 pm     213   Arc
FASTOPEN  EXE        12050   2-03-91   1:00 pm     258   Arc
 Clusters 2 - 51,160                                        Cluster 68
 C:\DOS                                                Offset 0  hex 0
```

9 Choose FIND AGAIN from the Tools menu to continue searching for root level directories.

Continue searching and recording cluster numbers of root level directories until you reach the end of the disk.

Reconstructing the Root Directory

Reconstruct your root directory with the root level directories you found in the preceding section. Begin by clearing the root directory.

To clear the root directory:

1 Choose DIRECTORY... from the Object menu.

The Change Directory dialog box appears

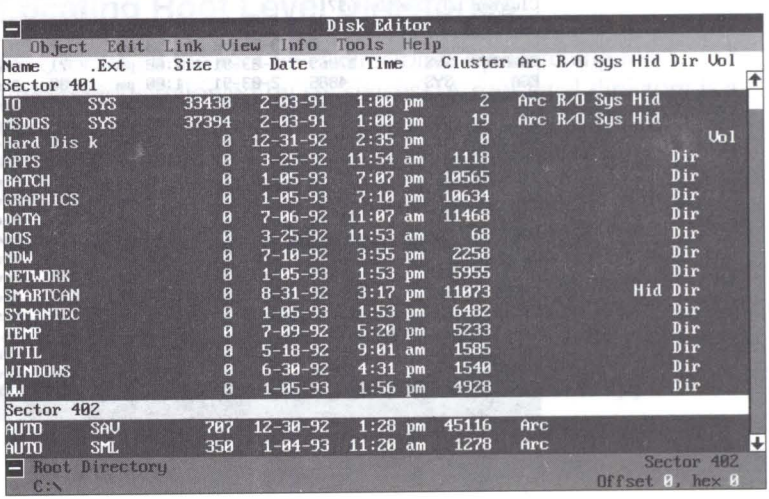
2 Highlight the root directory in the directory tree and select OK.

The root directory appears in Directory view with the first directory entry highlighted.

3 Choose MARK from the Edit menu.

4 Highlight all entries in the root directory by pressing PageDown until you reach the end of the root directory, as shown in Figure B-10.

Figure B-10 Selected root directory entries


Disk Editor
Object Edit Link View Info Tools Help
Name .Ext Size Date Time Cluster Arc R/O Sys Hid Dir Vol
Sector 401
IO SYS 33430 2-03-91 1:00 pm 2 Arc R/O Sys Hid
MSDOS SYS 37394 2-03-91 1:00 pm 19 Arc R/O Sys Hid
Hard Dis k 0 12-31-92 2:35 pm 0 Vol
APPS 0 3-25-92 11:54 am 1118 Dir
BATCH 0 1-05-93 7:07 pm 10565 Dir
GRAPHICS 0 1-05-93 7:10 pm 10634 Dir
DATA 0 7-06-92 11:07 am 11468 Dir
DOS 0 3-25-92 11:53 am 68 Dir
NDW 0 7-10-92 3:55 pm 2258 Dir
NETWORK 0 1-05-93 1:53 pm 5955 Dir
SMARTCAN 0 8-31-92 3:17 pm 11073 Hid Dir
SYMANTEC 0 1-05-93 1:53 pm 6482 Dir
TEMP 0 7-09-92 5:20 pm 5233 Dir
UTIL 0 5-18-92 9:01 am 1585 Dir
WINDOWS 0 6-30-92 4:31 pm 1540 Dir
WW 0 1-05-93 1:56 pm 4928 Dir
Sector 402
AUTO SAV 707 12-30-92 1:28 pm 45116 Arc
AUTO SML 350 1-04-93 11:20 am 1278 Arc
Root Directory
C:\
Sector 402
Offset 0, hex 0

5 Choose FILL... from the Edit menu.

The Fill dialog box appears.

6 Select OK.

Disk Editor fills the highlighted entries with 00 hexadecimal. This clears all directory entries and allows you to recreate your original root level directories.

If the disk you are working on is your boot disk, you'll want to make it bootable using the Disk Tools utility. See "Making a Disk Bootable" later in this appendix for complete information.

Once the disk is bootable, create new entries for the root level directories.

To create new entries for the root level directories:

1 Start Disk Editor.

2 Choose DRIVE... from the Object menu.

The Select the Disk You Wish to Edit dialog box appears.

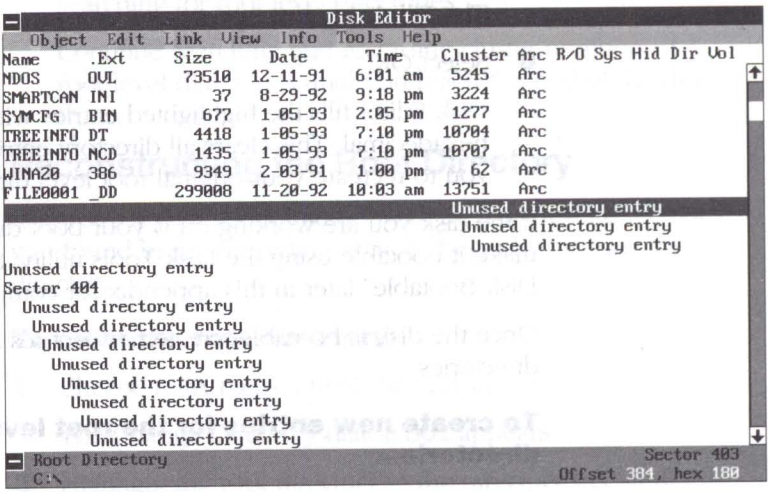
3 Select the disk with the damaged root directory then select OK.

The Disk Editor screen displays the root directory.

Each new entry for the root level directories requires a unique name, a file size of 0, the current date and time, the starting cluster number, and the DIR attribute to mark it as a directory.

4 Highlight the first available Unused Directory Entry line as shown in Figure B-11.

Figure B-11 Unused directory entries


Disk Editor
Object Edit Link View Info Tools Help
Name .Ext Size Date Time Cluster Arc R/O Sys Hid Dir Vol
NDOS OVL 73510 12-11-91 6:01 am 5245 Arc
SMARTCAN INI 37 8-29-92 9:18 pm 3224 Arc
SYMCFG BIN 677 1-05-93 2:05 pm 1277 Arc
TREEINFO DT 4418 1-05-93 7:10 pm 10704 Arc
TREEINFO NCD 1435 1-05-93 7:10 pm 10707 Arc
WINA20 386 9349 2-03-91 1:00 pm 62 Arc
FILE0001 _DD 299008 11-20-92 10:03 am 13751 Arc
Unused directory entry
Unused directory entry
Unused directory entry
Unused directory entry
Sector 404
Unused directory entry
Unused directory entry
Unused directory entry
Unused directory entry
Unused directory entry
Unused directory entry
Unused directory entry
Unused directory entry
Root Directory
C:\
Sector 403
Offset 304, hex 180

5. Enter a unique name for the current root level directory from your "Starting Cluster Numbers" list in the Name field.

6. Press Tab twice to move to the Size field. Enter a 0 in this field. Leave the .Ext field blank.

7. Tab once to the Date field and enter the current date using the mm-dd-yy format, where "mm" is month, "dd" is day, and "yy" is year.

8. Tab once to the Time field and enter the current time using the hh:mm:ss format, where "hh" is hours, "mm" is minutes, and "ss" is seconds.

9. Tab once to the Cluster field and enter the root level directory's starting cluster number in the Cluster field.

10. Tab five times to the Dir field and press the Spacebar once to toggle the Dir attribute on.

    Repeat the above procedure for all the root level directories recorded on your "Starting Cluster Numbers" list. Verify that you do not mix up the starting cluster numbers for the directories. Give unique names to the directories since duplicate names are not allowed by DOS.

    When you are finished, run Norton Disk Doctor to verify that the newly created directory entries are correct.

Removing Stubborn Files and Directories

When you cannot remove files or directories with DOS, use the methods described in the following sections. Use the procedure outlined in "Clearing the Read-Only Attribute" if you know the file or directory you want to delete has the DOS read-only attribute turned on. Otherwise, use the procedures in "Removing a Directory" or "Using Disk Editor to Remove Stubborn Files and Directories."

Clearing the Read-Only Attribute

Use the File Attributes (FA) utility to clear the DOS read-only attribute. Then delete the file with the DOS DEL command.

To clear the DOS read-only attribute and erase the file:

1. At the DOS prompt, type `FA d:path\filename /CLEAR` where "d:" is the drive, "path" is the directory path, and "filename" is the file's name. The /CLEAR switch removes all DOS attributes.
2. Type `del d:path\filename` to delete the file.

   For example, to clear the WORKIN.DOC file in the PROGS directory of all its attributes (including the read-only attribute), and then delete it, type:

```
FA c:\progs\workin.doc /CLEAR
del c:\progs\workin.doc
```

Removing a Directory

The simplest way to delete a stubborn directory and its contents is to use the Norton Change Directory (NCD) RMTREE command.

To remove a directory using Norton Change Directory:

1. At the DOS prompt, type `NCD RMTREE d:path` where "d:" is the drive and "path" is the directory name you want to delete. For example, `NCD RMTREE c:\dirtree` deletes the directory C:\DIRTREE.

2 Press Y when Norton Change Directory prompts you to confirm the deletion of the selected directory.

WARNING: Remember that all subdirectories and files contained in the directory are also deleted.

Using Disk Editor to Remove Stubborn Files and Directories

You can use Disk Editor to manually remove files or directories. Use this method when the directory entry for the file or directory is corrupt or invalid.

To remove files or directories with Disk Editor:

1 Start Disk Editor.

2 Choose DRIVE... from the Object menu.

The Select the Disk You Wish to Edit dialog box appears.

3 Select the drive with the stubborn file or directory then select OK.

4 Choose DIRECTORY... from the Object menu.

The Change Directory dialog box appears.

5 Select the directory that contains the file or directory you want to delete then select OK.

Disk Editor displays the contents of the directory in Directory view.

6 Select the file or directory entry you want to delete.

7 Using the LeftArrow and RightArrow keys, place the cursor under the first character of the file or directory entry's name.

8 Press Alt+F5 to replace the first character with the DOS sigma (σ) character. DOS marks erased entries with this character.

9 Choose WRITE CHANGES... from the Edit menu.

The Write Changes dialog box appears.

10 Select Write to write the change.

11 Choose EXIT from the Object menu to quit Disk Editor.

When you are done deleting files and directories, run Norton Disk Doctor to clear the lost clusters left behind.

Fixing Bad Directory Entries

Use the procedure in this section if you notice that:

- Some files have disappeared from an otherwise normal directory, but were not actually erased.
- CHKDSK reports "Tree not processed past this point."
- There are corrupt filenames in your directory when you use the DIR command.

When DOS scans a directory, it reads all entries until it encounters the first blank entry (the first entry with "0" as its first character). Sometimes valid directory entries exist after a blank directory entry, making them unreachable by DOS.

You can fix this problem by inserting valid directory entries (the DOS erased file character "σ") in every blank directory entry preceding the valid entries.

DOS sometimes inserts illegal characters in a directory entry, making it unreadable. You can repair the entry so that DOS can recognize it or erase it altogether, again using the DOS erased file marker.

TIP: Try fixing this problem with Norton Disk Doctor first.

Fixing Corrupt Entries

If you know the proper values for a corrupt directory entry, replace the illegal characters with it. For example, if a file once named REPORTS.DOC becomes Rσ♥ORTS.DOC, enter "E" and "P" over the illegal DOS characters "σ" and "♥" to make the entry valid again.

To fix corrupt entries:

1 Start Disk Editor.

2 Choose DRIVE... from the Object menu.

The Select the Disk You Wish to Edit dialog box appears.

3 Select the drive with bad directory entries then select OK.

4 Choose DIRECTORY... from the Object menu.

The Change Directory dialog box appears.

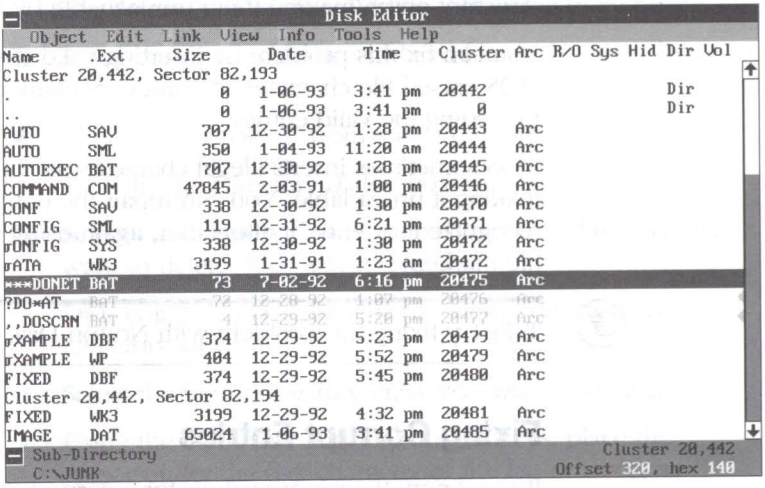
5 Select the directory that contains the bad entries then select OK.

Disk Editor displays the contents of the directory in Directory view.

6 Highlight a bad entry using the RightArrow and LeftArrow keys.

Any entries or parts of entries displayed in red, or marked with chevrons if you have a monochrome monitor, is a bad directory entry, as shown in Figure B-12.

Figure B-12 Bad directory entries


Disk Editor
Object Edit Link View Info Tools Help
Name .Ext Size Date Time Cluster Arc R/O Sys Hid Dir Vol
Cluster 20,442, Sector 82,193
. 0 1-06-93 3:41 pm 20442 Dir
.. 0 1-06-93 3:41 pm 0 Dir
AUTO SAV 707 12-30-92 1:28 pm 20443 Arc
AUTO SML 350 1-04-93 11:20 am 20444 Arc
AUTOEXEC BAT 707 12-30-92 1:28 pm 20445 Arc
COMMAND COM 47845 2-03-91 1:00 pm 20446 Arc
CONF SAV 338 12-30-92 1:30 pm 20470 Arc
CONFIG SML 119 12-31-92 6:21 pm 20471 Arc
▯ONFIG SYS 338 12-30-92 1:30 pm 20472 Arc
▯ATA WK3 3199 1-31-91 1:23 am 20472 Arc
***DONET BAT 73 7-02-92 6:16 pm 20475 Arc
?DO*AT BAT 72 12-28-92 1:02 pm 20476 Arc
,,DOSCRN BAT 4 12-29-92 5:28 pm 20477 Arc
▯XAMPLE DBF 374 12-29-92 5:23 pm 20479 Arc
▯XAMPLE WP 404 12-29-92 5:52 pm 20479 Arc
FIXED DBF 374 12-29-92 5:45 pm 20480 Arc
Cluster 20,442, Sector 82,194
FIXED WK3 3199 12-29-92 4:32 pm 20481 Arc
IMAGE DAT 65024 1-06-93 3:41 pm 20485 Arc
Sub-Directory
C:\JUNK
Cluster 20,442
Offset 320, hex 140

7 Highlight the field with illegal characters using the Tab, LeftArrow, and RightArrow keys.

8 Overwrite the illegal characters with valid characters.

9 Choose WRITE CHANGES... from the Edit menu.

The Write Changes dialog box appears.

10 Select OK to write the change.

Bridging Good Directory Entries

For the bad or unused directory entries that you cannot fix, bridge the good entries by converting the bad or unused entries into erased entries.

To mark bad entries as erased and bridge good entries:

1. Use PageDown and PageUp to locate the groups of valid entries and the bad or unused directory entries in between them.
2. Highlight a bad or unused directory entry using the UpArrow and DownArrow keys.
3. Using the LeftArrow and RightArrow keys, place the cursor under the first character in the Name field of the bad entry.
4. Press Alt+F5 to replace the first character with the DOS sigma character (σ).
5. Choose WRITE CHANGES... from the Edit menu.

   The Write Changes dialog box appears.
6. Select OK to write the change.
7. Choose EXIT from the Object menu to quit Disk Editor.

Run Norton Disk Doctor to clear any lost clusters.

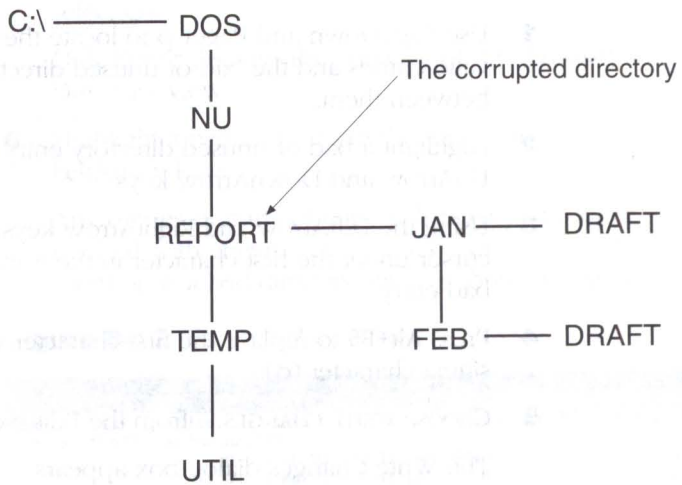
Recovering Lost Subdirectories from a Bad Directory

Directories in DOS are special kinds of files, known as directory entries, that contain file and subdirectory information. These special files can become corrupt and unreadable if the cluster they reside in is damaged.

When DOS cannot read a directory, the files and subdirectories it contains are no longer accessible. Norton Disk Doctor considers them "lost clusters" instead of the files and subdirectories they actually are.

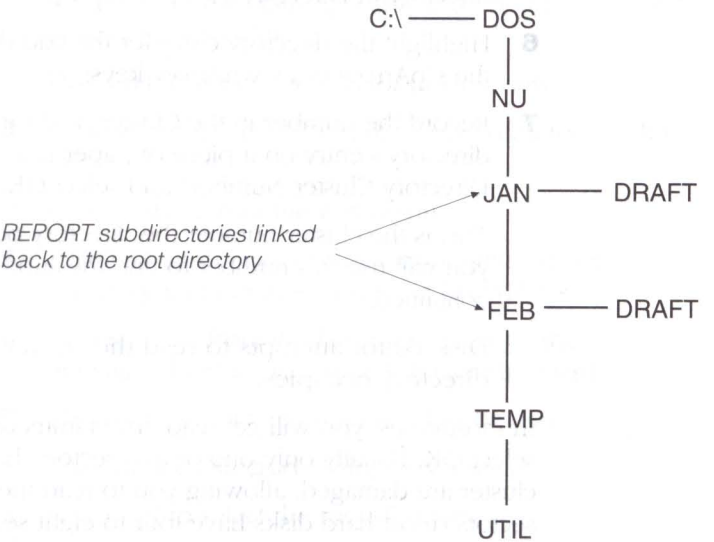
To recover subdirectories that are lost when their parent directory becomes corrupted, you need to find the subdirectories and link them to the root directory. Figure B-13 shows an example directory structure before one of its root level directories, REPORT, becomes unreadable.

Figure B-13 An example directory structure



Assume that the cluster the REPORT directory occupies is physically damaged and DOS can no longer read it. All subdirectories and files contained in REPORT are inaccessible. Disk Editor can link the lost subdirectories back to the root directory as shown in Figure B-14.

Figure B-14 The repaired directory structure



Recovering Valid Entries from the Bad Directory

First, determine how much of the directory is readable and how much is unreadable. If valid directory entries are still readable, copy and link them to the root directory.

To determine if good entries are still readable:

1. Start Disk Editor.
2. Choose DRIVE... from the Object menu.

   The Select the Disk You Wish to Edit dialog box appears.
3. Select the drive with the bad directory then select OK.
4. Choose DIRECTORY... from the Object menu.

   The Change Directory dialog box appears.
5. Select the *parent* of the bad directory then select OK. In the figures above, the parent of the REPORT directory is the root directory.

The Disk Editor screen displays the contents of the directory in Directory view.

6 Highlight the directory entry for the bad directory using the UpArrow or DownArrow keys.

7 Record the number in the Cluster field for the bad directory's entry on a piece of paper labeled "The Bad Directory Cluster Number" and select OK.

This is the cluster number the directory occupies. Later, you will use this number to find the subdirectories it contained.

Disk Editor attempts to read the cluster the bad directory occupies.

In most cases, you will get read errors immediately after you select OK. Usually only one or two sectors that make up the cluster are damaged, allowing you to read the remaining good sectors (most hard disks have four to eight sectors per cluster).

To determine readable sectors:

1 If you immediately get a read error from Disk Editor, select OK to clear the message.

2 Use the PageDown key to attempt to read the next sector of the cluster.

3 Record the good sector number on a piece of paper labeled "Good Sectors."

Look at the status line for the current sector number.

4 Continue pressing the PageDown key until you reach the end of the cluster or you cannot advance past the Disk Editor read errors.

Using the good sector numbers, you can relocate the valid entries to the root directory.

To copy to good entries to the root directory:

1 Choose SECTOR... from the Object menu.

The Select Sector Range dialog box appears.

2 Enter the first sector number from your "Good Sectors" list into both the Starting Sector and Ending Sector text boxes and select OK.

   Disk Editor displays the sector in Hex view.

3 Choose AS DIRECTORY from the view menu to switch to Directory view.

4 Choose MARK from the Edit menu.

5 Highlight all the valid entries, excluding Unused Directory Entry entries, using the DownArrow key.

6 Choose COPY from the Edit menu to copy the highlighted entries to the Disk Editor clipboard.

7 Choose DIRECTORY... from the Object menu.

   The Change Directory dialog box appears.

8 Select OK to select the root directory.

   Disk Editor displays the root directory in Directory view.

9 Highlight the first Unused Directory Entry entry.

10 Choose PASTE OVER from the Edit menu to append the directory entries from the clipboard to the root directory.

11 Choose WRITE CHANGES... from the Edit menu.

Repeat the above procedure for all the sectors you recorded.

Finding and Linking Lost Subdirectories

You can find all lost subdirectories that were contained in the bad directory and link them back to the root directory.

Only look for subdirectories that are top-level child directories of the bad directory. In the example in Figure B-13, JAN, FEB, and MARCH are top-level child directories. The other subdirectories, such as DRAFT and FINAL, are not.

Finding Top-Level Child Directories

You must find the top-level child directories before you can link them to the root directory.

To find top-level child directories:

1. Start Disk Editor and choose DRIVE... from the Object menu.

   The Select the Disk You Wish to Edit dialog box appears.

2. Select the drive with the damaged root directory then select OK.

   A scan progress box appears briefly.

3. Choose CLUSTER... from the Object menu.

   The Select Cluster Range dialog box appears.

4. Enter 2 in the Starting Cluster text box and select OK.

5. Choose FIND OBJECT from the Tools menu, then choose SUBDIRECTORY from the submenu that appears.

6. Choose AS DIRECTORY from the View menu when Disk Editor finds the search string.

7. If the screen does not resemble a directory listing, choose FIND AGAIN from the Tools menu to continue searching for top-level directories.

   Or,

   If the screen does resemble a directory listing, look at the number in the Cluster field for the ".. " entry.

8. If this number is the same as the number you recorded as "The Bad Directory Cluster Number," record the number next to the Cluster label on the status line at the bottom of the screen on a piece of paper labeled "Top-level Child Directories." Continue searching for additional top-level child directories.

   Or,

   If this number is not the same, choose FIND AGAIN from the Tools menu to continue searching for top-level child directories.

Repeat this procedure until you locate all the top-level child directories you want to recover.

Linking the Top-Level Child Directories to the Root Directory

Link the top-level directories to the root directory by creating new entries for them. Any subdirectories of the top-level directories are automatically resurrected.

To create new entries for the top-level child directories:

1. Choose DIRECTORY... from the Object menu.

   The Change Directory dialog box appears.

2. Select OK.

   Disk Editor displays the root directory in Directory view.

   Each new entry for the top-level directories requires a unique name, a file size of 0, the current date and time, the starting cluster number from your "Top-level Child Directories" list, and the Dir attribute to mark it as a directory.

3. Highlight the first available Unused Directory Entry entry using the UpArrow and DownArrow keys.

4. Enter a unique name for the current top-level directory in the Name field.

5. Tab twice to the Size field and enter a 0. Leave the .Ext field blank.

6. Tab once to the Date field and enter the current date using the mm-dd-yy format.

7. Tab once to the Time field and enter the current time using the hh:mm:ss format.

8. Tab once to the Cluster field and enter the current top-level child directory's cluster number in the Cluster field.

9. Tab five times to the Dir field and press the Spacebar once to toggle the Dir attribute on.

Repeat the above procedure for all the top-level child directories on your list. Verify that you do not mix up the starting cluster numbers for the directories. Remember to give unique names to the directories since duplicate names are not allowed by DOS.

Adjusting the Parent Directory Pointers

Adjust the ".. " entry for each of the newly created top-level directories so that it points to the root directory, and not the bad directory it was pointing to.

To adjust the parent directory pointers:

1. Highlight a newly created top-level directory entry using the PageDown, PageUp, and arrow keys and press Enter.

   You should see a list of directory entries with the first two entries being ". " and ".. ".

2. Highlight the number in the Cluster field for the ".. " entry using Tab, and enter a 0 in the field.

3. Choose WRITE CHANGES... from the Edit menu.

   The Write Changes dialog box appears.

4. Select OK to write the change.

5. Highlight the ".. " entry using the Shift+Tab key combination and select OK.

   Disk Editor links the top-level directory back to the root directory.

Repeat the above procedure for all the new top-level directory entries. Use Norton Disk Doctor to clean up any lost clusters left on your disk.

Editing the Boot Record

The boot record (not to be confused with the master boot program) occupies sector 0 of a logical disk. A logical disk is a hard or floppy disk that has been partitioned and formatted by DOS.

The boot record stores important information about the disk, such as the type and version of DOS, bytes per sector, sectors per cluster, sectors per FAT, and so on.

On a floppy disk, the boot record is the physical and logical beginning of the disk. On a hard disk, the boot record is the beginning of a specific partition (logical disk drive), but it is not the beginning of the physical disk.

Instead, the beginning of the physical disk holds the master boot program and the partition table. The master boot program is the first program the computer runs when you start the computer. This and the partition table allow the computer to know that one or more logical drives are installed and may be bootable.

The partition table points to the boot records of all logical drives located on that physical disk. For example, if you have a 60 MB disk partitioned in a 30 MB drive C: and a 30 MB drive D:, you have two boot records located on the physical disk. The partition table stores the absolute sector location of both these boot records as well as other physical dimensions about these logical drives.

If you suspect that some information may be corrupt or inaccurate in a boot record, run Norton Disk Doctor to fix any problems quickly and automatically.

Editing the Media Descriptor Byte

The media descriptor byte, which DOS uses to determine the disk media type it is accessing, is located in three different locations on your disk. The sector and offset values for the three locations are:

- Sector 0, Offset 21 of the boot record
- Sector 1, Offset 0 of FAT 1
- Sector 1, Offset 0 of FAT 2

Different versions of DOS use either of the first two locations of the media descriptor byte for disk information. The second copy of the FAT is usually not used by DOS, but is used by Norton Disk Doctor and CHKDSK to perform data recovery.

Use Norton Disk Doctor to fix any problems with the media descriptor byte, although you can also use Disk Editor to manually change the values.

WARNING: Incorrectly setting the media descriptor byte value could render your disk inaccessible or result in data loss. Continue with the following procedure only if you know exactly what you are doing.

Editing the Media Descriptor Byte on the Boot Record

Start with the media descriptor byte on the boot record. If it is incorrect, change it.

To edit the media descriptor byte on the boot record:

1. Start Disk Editor.
2. Choose DRIVE... from the Object menu.

   The Select the Disk You Wish to Edit dialog box appears.
3. Select the disk with the boot record you want to edit then select OK.
4. Choose BOOT RECORD from the Object menu.

   Disk Editor displays the boot record.
5. Using the DownArrow key, highlight the "Media descriptor byte" field at offset 21, hex 15.

   Use the status bar's Offset and Hex labels to verify your position.
6. Compare the byte value, in hexadecimal, to the values in the Table B-1 later in this appendix. If the value is incorrect, continue with the following procedure.

To correct an incorrect boot record media descriptor byte value:

1. Enter the correct media descriptor byte value for the type of media in the "Media descriptor byte" field.
2. Choose WRITE CHANGES... from the Edit menu.

   The Write Changes dialog box appears.
3. Select OK to write the change.

Editing the Media Descriptor Byte on FAT 1

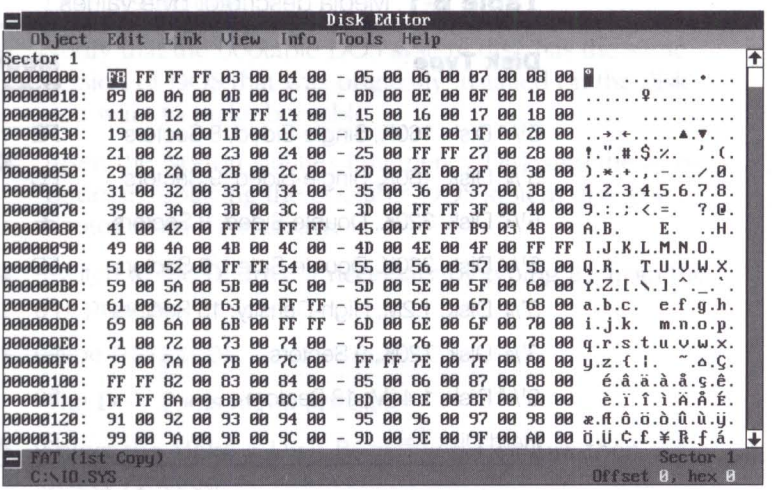
After the boot record, check and edit the media descriptor byte on the first copy of the FAT.

To edit the media descriptor byte on the first copy of the the FAT:

1. Choose 1ST FAT from the Object menu.
2. Choose AS HEX from the View menu.
3. Highlight the media descriptor byte at offset 0, hex 0, using the LeftArrow and RightArrow keys. See Figure B-15.

   Use the status bar's Offset and Hex labels to verify your position.

Figure B-15 FAT media descriptor byte



The status bar labels show your position

4. Compare the byte value, in hexadecimal, to the values in Table B-1 later in this appendix. If the value is incorrect, continue with the following procedure.

To correct an incorrect FAT 1 media descriptor byte value:

1. Enter the correct media descriptor byte for the type of media in the "Media descriptor byte" field.

2 Choose WRITE CHANGES... from the Edit menu.

The Write Changes dialog box appears.

3 Select OK to write the change.

Editing the Media Descriptor Byte on FAT 2

As with the first copy of the FAT, you can edit the media descriptor byte on the second copy of the FAT.

To edit the media descriptor byte on the second copy of the FAT:

- Choose 2ND FAT from the Object menu and follow the steps in the "To edit the media descriptor byte on the first copy of the the FAT:" procedure earlier in this appendix.

Table B-1 Media descriptor byte values

Disk Type	Media Descriptor Byte
5¼" Disk, 160K, Single-Sided, 8 Sectors	FE
5¼" Disk, 180K, Single-Sided, 9 Sectors	FC
5¼" Disk, 320K, Double-Sided, 8 Sectors	FF
5¼" Disk, 360K, Double-Sided, 9 Sectors	FD
5¼" Disk, 1.2M, High-Density, 15 Sectors	F9
3½" Disk, 720K, 9 Sectors	F9
3½" Disk, 1.44M, 18 Sectors	F0
Hard Disk	F8

Making a Disk Bootable

Use this procedure if your hard disk works properly, but is no longer bootable. Do not use this procedure if you are trying to upgrade to a higher version of DOS.

A hard disk may become unbootable for two major reasons. The first reason is the absence or corruption of the two hidden system files (IO.SYS and MSDOS.SYS for MS-DOS; IBMBIO.COM and IBMDOS.COM for PC-DOS) or the absence or corruption of

COMMAND.COM, the default command processor. If you have been using a third-party replacement for COMMAND.COM, such as NDOS.COM or 4DOS.COM, corruption or absence of those files can also cause boot problems.

The second, more obscure cause arises when the value of the partition table section called Boot is modified to NO. This tells DOS that the disk is not a bootable disk even if it actually is.

Using Disk Tools to Make a Disk Bootable

Use the Norton Utilities Disk Tools to automatically make a disk bootable.

To make the disk bootable using Disk Tools:

1. Start your machine from the A: drive with a bootable DOS system disk.

   Verify that the bootable DOS system disk has the same version of DOS that was originally installed on the disk you want to make bootable.

2. Insert the Norton Utilities Emergency Disk into the A: or B: drive, replacing the bootable DOS system disk you booted from if necessary.

3. Switch to the B: drive if necessary by typing `B:` from the `A:` prompt.

4. Type `DISKTOOL`.

   The Disk Tools menu appears.

5. Select the Make a Disk Bootable procedure then select Proceed.

   The Make Disk Bootable dialog box appears.

6. Select the disk you wish to make bootable then select OK.

   The Drive X: Will Be Made Bootable dialog box appears, where "X:" is the drive you specified.

7. Select OK to continue.

   The Drive X: is Now a Bootable Disk dialog box appears to notify you that the procedure is finished.

8 Select OK.

The Disk Tools menu appears.

9 Select Quit to exit to the DOS prompt.

Restart your computer to verify that the disk is bootable.

Using Disk Editor to Edit the Partition Table

Disk Editor can edit the partition table to set a disk as bootable.

To edit the Boot section of the partition table with Disk Editor:

1 Start your computer from the A: drive with a bootable DOS system disk.

2 Start Disk Editor.

3 Choose DRIVE... from the object menu.

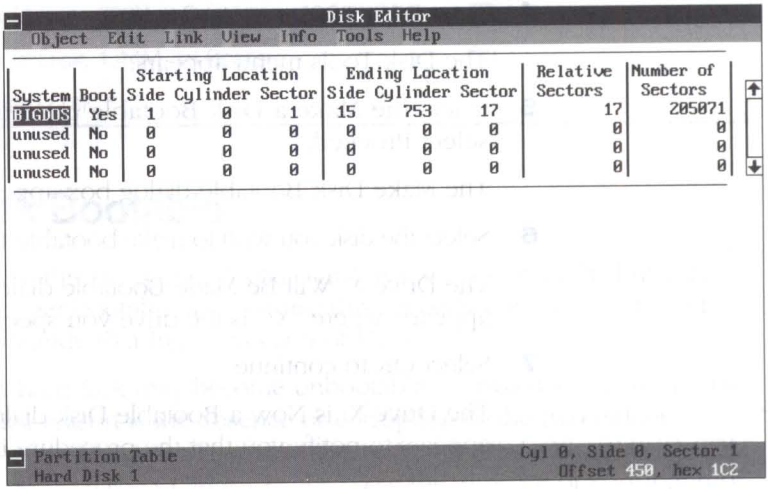
The Select the Disk You Wish to Edit dialog box appears.

4 Select the disk you want to make bootable then select OK.

5 Choose PARTITION TABLE from the Object menu.

Disk Editor displays the partition table in Partition Table view as shown in Figure B-16.

Figure B-16 Disk Editor in Partition Table view


Disk Editor
Object Edit Link View Info Tools Help
System Boot Starting Location Side Cylinder Sector Ending Location Side Cylinder Sector Relative Sectors Number of Sectors
BIGDOS Yes 1 0 1 15 753 17 17 205071
unused No 0 0 0 0 0 0 0 0
unused No 0 0 0 0 0 0 0 0
unused No 0 0 0 0 0 0 0 0
Partition Table
Hard Disk 1
Cyl 0, Side 0, Sector 1
Offset 450, hex 1C2

6 Tab to the Boot section.

7 If the Boot section displays NO, press the Spacebar to toggle it to YES.

8 Choose WRITE CHANGES... from the Edit menu.

The Write Changes dialog box appears.

9 Select OK to write the change.

10 Choose EXIT from the Object menu to quit Disk Editor.

Restart your computer to verify that it boots from the hard drive.

Editing a Partition Table

If you suspect some information may be corrupt or inaccurate in your partition table, run Norton Disk Doctor with the /REBUILD switch to diagnose and fix any problems found. For example, type `NDD /REBUILD` at the DOS prompt.

For complete information regarding Norton Disk Doctor, see "Diagnosing Disks with Norton Disk Doctor" in Chapter 3, "Recovery Tutorials," and Chapter 26, "Norton Disk Doctor (NDD)."

Fixing a Bad Track 0

Every hard disk partitioned and formatted with DOS has a track 0. The precise BIOS address for track 0 is cylinder 0, side 0. Interestingly enough, only the first sector of cylinder 0, side 0 is used even though it is collectively referred to as a "track" and not a sector.

Track 0 stores the all important master boot program (MBP) and the partition table. If this sector ever becomes unreadable for any reason, DOS cannot mount your hard disk.

To have DOS recognize and mount the disk again, you need to copy a valid MBP back to Track 0 and rebuild the partition table. If you installed DOS 5.0 or later on your computer, you can use an undocumented feature of FDISK to write a copy of the MBP to track 0. Otherwise, you can

either get a copy from another computer or manually enter the generic MBP provided in this section.

After the MBP has been restored, you need to use Norton Disk Doctor to rebuild the partition table.

Writing a Good Master Boot Program

The following sections detail the three possible methods you can use to restore your master boot program. Use method one if your computer has DOS 5.0 or later installed and you have a copy of the FDISK utility in executable form. If you installed some other version of DOS or do not have the FDISK utility, but have another computer with the same version of DOS from which you can copy the MBP, use method two. Use method three if you do not have the FDISK utility or another computer with the same version of DOS.

Method One: Using FDISK to Write a Good MBP

This method requires that you have DOS 5.0 or later installed on the computer with the bad track 0.

To use FDISK to write a good master boot program:

1. Start your computer from the A: drive with a bootable DOS system disk.
2. If FDISK is not on the boot disk, insert the disk with FDISK into the A: drive.
3. Type `fdisk /mbr`.

   If the DOS prompt returns with no error messages, skip to "Rebuilding the Partition Table with Norton Disk Doctor." FDISK has successfully written a good copy of the MBP to your damaged hard disk.

Method Two: Copying a Good MBP from Another Computer

For this procedure, you need to have access to another computer with the same version of DOS as the computer with the bad track 0.

To copy the MBP onto a floppy disk:

1. Start Disk Editor on a computer that has the same version of DOS as yours. If this computer does not have Disk Editor installed, insert the Norton Utilities Emergency Disk and start Disk Editor from it.
2. Insert a blank, formatted floppy disk into the other computer's A: or B: drive. If necessary, remove the Norton Utilities Emergency Disk and replace it with the blank floppy disk.

   Make sure that the floppy disk can be read by either the A: or B: drive of the computer with the damaged disk.
3. Choose PARTITION TABLE from the Object menu.
4. Choose WRITE OBJECT TO... from the Tools menu.

   The Write dialog box appears.
5. Select OK.

   The Save dialog box appears.
6. Type `a:master` (or `b:master`) in the Enter Filename to Write Object To text box and select OK.

   A confirmation dialog box appears.
7. Select Yes to write.

   The write progress screen appears for the duration of the write operation.
8. Choose EXIT from the Object menu to quit Disk Editor.
9. Use the DIR command to verify that there is a file with a size of 512 bytes named MASTER on the floppy disk.

To write the MBP to the damaged disk:

1. Start the computer with the damaged disk from the A: drive with a bootable DOS system disk.
2. Start Disk Editor from the Norton Utilities Emergency Disk, replacing the bootable DOS system disk if necessary.

3 Insert the disk with the MASTER file into the A: drive, replacing the Norton Utilities Emergency Disk if necessary.

4 Choose DRIVE... from the Object menu.

The Select the Disk You Wish to Edit dialog box appears.

5 Highlight the A: drive and select OK.

Disk Editor displays the root directory of the floppy disk in drive A:.

6 Highlight MASTER using the UpArrow and DownArrow keys and select OK.

7 Choose WRITE OBJECT TO... from the Tools menu.

The Write dialog box appears.

8 Select To Physical Sectors then select OK.

The Select Physical Drive to Write Object to dialog box appears.

9 Select Hard Disk then select OK.

The Write Object to Physical Sectors dialog box appears.

10 Select OK to write the good MBP to track 0.

A warning dialog box appears.

11 Select OK to clear the warning and complete the writing process.

Go to the "Rebuilding the Partition Table with Norton Disk Doctor" section later in this appendix.

Method Three: Manually Entering a Generic MBP

As a last resort, you can manually enter the MBP into track 0.

To manually enter a generic MBP:

1 Start the computer with the damaged disk from the A: drive.

2 Insert the Norton Utilities Emergency Disk into the A: or B: drive.

3 Start Disk Editor.

4 Choose DRIVE... from the Object menu

The Select the Disk You Wish to Edit dialog box appears.

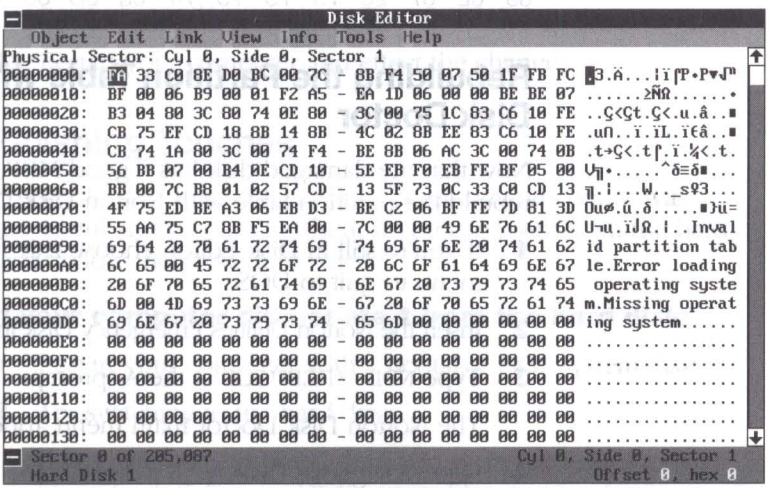
5 Select Physical Disks in the Type group box.

6 Select Hard Disk 1 then select OK.

The cylinder 0, side 0, sector 1 (track 0) appears in Hex view, with the cursor and highlight at offset 0, hex 0.

7 Use the Offset and Hex labels on the status bar in the lower-right corner of the screen to verify the cursor's position. See Figure B-17.

Figure B-17 Cylinder 0, side 0, sector 1



8 Enter the generic MBP shown in Figure B-18 to your disk's track 0.

Make sure that you copy every hex value exactly. Even a single mistake may sabotage the overall procedure.

Go to the "Rebuilding the Partition Table with Norton Disk Doctor" section later in this appendix.

Figure B-18 A generic master boot program

```
FA 33 C0 8E D0 BC 00 7C-8B F4 50 07 50 1F FB FC
BF 00 06 B9 00 01 F2 A5-EA 1D 06 00 00 BE BE 07
B3 04 80 3C 80 74 0E 80-3C 00 75 1C 83 C6 10 FE
CB 75 EF CD 18 8B 14 8B-4C 02 8B EE 83 C6 10 FE
CB 74 1A 80 3C 00 74 F4-BE 8B 06 AC 3C 00 74 0B
56 BB 07 00 B4 0E CD 10-5E EB F0 EB FE BF 05 00
BB 00 7C B8 01 02 57 CD-13 5F 73 0C 33 C0 CD 13
4F 75 ED BE A3 06 EB D3-BE C2 06 BF FE 7D 81 3D
55 AA 75 C7 8B F5 EA 00-7C 00 00 49 6E 76 61 6C
69 64 20 70 61 72 74 69-74 69 6F 6E 20 74 61 62
6C 65 00 45 72 72 6F 72-20 6C 6F 61 64 69 6E 67
20 6F 70 65 72 61 74 69-6E 67 20 73 79 73 74 65
6D 00 4D 69 73 73 69 6E-67 20 6F 70 65 72 61 74
69 6E 67 20 73 79 73 74-65 6D 00 00 00 00 00 00
```

Rebuilding the Partition Table with Norton Disk Doctor

Now that the damaged disk has a good MBP, you need to rebuild the partition table with Norton Disk Doctor.

1. If you're still in Disk Editor, choose EXIT from the Object menu to quit to DOS.
2. Insert the Norton Utilities Emergency Disk in the A: drive.
3. Type `NDD /REBUILD` at the A: prompt.

   The Norton Disk Doctor main menu appears.
4. Select Diagnose Disk.

   The message box "There are no DOS partitions on hard disk 1" should appear in a few moments.
5. Select OK to have Norton Disk Doctor rebuild the partition table when the message screen appears.

   Norton Disk Doctor should find the primary partition in few moments.
6. Select OK to revive it.
7. Select OK again to allow Norton Disk Doctor to search for additional partitions if the damaged disk has more than one partition. Otherwise, select No by pressing N.

Before any changes are made to the damaged disk, Norton Disk Doctor displays the Create Undo File dialog box to allow you to create an Undo file.

8 Select OK when this dialog box appears to save an Undo file.

The Create UNDO File dialog box appears.

9 Select either A: or B: as the destination drive.

10 Insert a formatted floppy disk with at least 100K of free space into the selected drive and select OK.

After Norton Disk Doctor has rebuilt the partition table and saved the Undo file, the "Partition information has been changed" message appears.

11 Restart your computer and effect the changes.

Finishing Touches

If you can start from the hard disk, then this procedure was successful and you are finished. If you can't start from the hard disk, follow the procedure below.

If your computer did not start from the hard disk:

1 Restart your computer with a bootable DOS system disk.

2 Try switching to the hard drive.

If you get the C: prompt, then you were successful in fixing track 0, but the DOS system files on your hard disk are either corrupted or missing. Go to step 3.

3 Follow the procedure in the "Making a Disk Bootable" section earlier in this appendix to make the disk bootable.

If you get an error message that says "Invalid drive specification, and you still cannot access the disk, call Symantec Technical Support.

Low-Level Formatting for an ST-506 Controller and an MFM Hard Disk

If you need to perform a destructive, low-level format on a hard disk attached to a ST-506 MFM hard disk controller, use the DEBUG procedure below. Refer to your DOS manual for more information on the DOS DEBUG utility.

To low-level format an MFM hard disk attached to an ST-506 controller:

1. Start your computer with a bootable DOS system disk.
2. If the DOS system disk does not contain DEBUG, replace it with a disk that does.
3. Type `debug`.
4. Enter `G=C800:5` at the "-" prompt.

   DEBUG starts the BIOS low level format routine.
5. Select the interleave factor that will give your disk the fastest access time.

   The standard for an ST-506 controller is 3:1 interleave, although you might consult with the manufacturer of your hard disk to verify this.

APPENDIX

Command Line Reference

This appendix contains two alphabetically ordered sections. The first section lists the Norton Utilities commands and the second section lists NDOS commands.

Norton Utilities Global Switches

There are several switches that you can use with all of the Norton Utilities programs. They are listed here rather than in each command-line syntax. These switches are used primarily to set your display preferences.

```
program [/BW | /HERC | /LCD] [/G0 | /G1 | /M0
   | /M1] [/NOZOOM] [/MULTITASK] | [/NO_DISK]
   | [/NOEMS] | [/NOXMS] | [/NOUMB] | [NOFRAME]
```

program	One of the Norton Utilities.
/BW	For monochrome displays.
/G0	For EGA and VGA displays: disable graphical mouse and all graphic characters.
/G1	For EGA and VGA displays: disable graphical mouse and graphical dialogs.
/M0	Disable graphical mouse.
/M1	Enable graphical mouse.
/HERC	For Hercules graphics displays.
/LCD	For laptop LCD displays.
/MULTITASK	Disable check for multitasking. If you override this switch, data loss may occur.
/NOZOOM	Disable dialog box zooming.

/NO_DISK	Disable memory swapping to disk.
/NOEMS	Disable memory swapping to EMS memory and use of the EMS page frame.
/NOXMS	Disable memory swapping to extended memory and use of UMB memory regions.
/NOUMB	Disable use of UMB memory regions.
/NOFRAME	Disable use of the EMS page frame but continue to use EMS.

NOTE: If you do not specify one of these switches, the defaults stored in the Norton Utilities configuration file SYMCFG.BIN will be used.

Norton Utilities Commands

Most of the programs in the Norton Utilities can run in one of two ways: using the full-screen mode or using command-line switches. A few can run using a combination of the two, while a few others can run only from the command line. Refer to the appropriate chapter for more detailed information on a program before you run it.

BE (Batch Enhancer)

Enhance your batch files with a set of special commands.

```
BE command [parameters]
BE pathname [[GOTO] label]
```

command — One of the following:

ASK	PRINTCHAR
BEEP	REBOOT
BOX	ROWCOL
CLS	SA
DELAY	SHIFTSTATE
EXIT	TRIGGER

	GOTO WEEKDAY
	JUMP WINDOW
	MONTHDAY
	These Batch Enhancer commands are described in the following sections.
parameters	BE command parameters and switches.
pathname	Name of a Batch Enhancer script file. BE script files are text files that can contain only Batch Enhancer commands; DOS commands are ignored. Using BE before the command is optional in a script file.
GOTO	Specify where execution should begin. See BE GOTO.
label	Label in Batch Enhancer script file at which to start execution.

For help on a specific command type `BE command /?` at the DOS prompt.

BE ASK

Request input from the keyboard and set an exit code (errorlevel).

```
BE ASK "prompt" [key-list] [DEFAULT=key]
  [TIMEOUT=n] [ADJUST=n] [color] [/DEBUG]
```

prompt	Text string to display when the command runs. If the prompt string has embedded commas and/or spaces, enclose the entire string in double quotation marks. Put two quotation marks together if you do not want to display a prompt.
key-list	List of response keys (characters or numbers).
DEFAULT	The key returned if you don't press a key within the timeout period, or if you press Enter.

TIMEOUT	Time in seconds before the default key is returned. If *n* is zero, or no timeout is specified, ASK will wait forever.
ADJUST	Adjust the return value by the amount you specify.
color	Screen Attribute (SA) format color specification for the text of the prompt (see BE SA).
/DEBUG	Display the errorlevel value returned.

BE generates a beep if the user presses a key that is not in the designated key-list.

BE BEEP

Specify the frequency and duration of a tone or a series of tones in a script file.

```
BE BEEP [/Dn] [/Fn] [/Rn] [/Wn]
BE BEEP script file [/E]
```

/Dn	Duration of the tone, in 1/18 of a second.
/Fn	Frequency of the tone; *n* is cycles per second (Hertz).
/Rn	Repeat the tone *n* times.
/Wn	Wait between tones *n*/18 of a second.
/E	Echo the quoted text in comments.

The BEEP command uses a special form of script file. For more information on script files, refer to Chapter 6, "Batch Enhancer (BE)." If you place comments in the script file following the switches, precede them with a semicolon. If you use the /E switch, comments enclosed in quotation marks display when the script file runs. For example, to display "sol" when the note "A" (/F440) is sounded, use the following:

```
/F440 /D36 /R3 /W18; This is the "sol" note.
```

BE BOX

Draw a rectangle at a specified location on the screen.

```
BE BOX top left bottom right [SINGLE |
  DOUBLE] [color]
```

top	Row number for upper-left corner of box.
left	Column number for upper-left corner of box.
bottom	Row number for lower-right corner of box.
right	Column number for lower-right corner of box.
SINGLE	Single line outline.
DOUBLE	Double line outline.
color	Screen Attribute (SA) format color specification for the box (see BE SA).

The default box border is a double outline. Text within the box is not overwritten.

BE CLS

Clear the screen, optionally using the specified screen attribute.

```
BE CLS [color]
```

color	Screen Attribute (SA) format color specification (see BE SA).

BE CLS is similar to the BE SA /CLS command, but BE CLS uses a direct call to the BIOS clear screen function.

BE DELAY

Pause execution of a batch file for a specified length of time.

```
BE DELAY ticks
```

ticks	The number of clock ticks (in 1/18 of a second) to pause.

BE EXIT

Terminate execution of a Batch Enhancer script file, before the end of the file is reached.

```
BE EXIT
```

The BE EXIT command only appears in script files. It has no effect if executed directly from DOS.

BE GOTO

Specify where execution should begin in a Batch Enhancer script file rather than starting at the beginning of the file, which is the default.

```
BE pathname [[GOTO] label]
```

pathname — A Batch Enhancer script file.

label — A valid label that exists inside a script file.

The GOTO command is optional as long as you define a label after the name of the script file.

The conventions for script file labels are the same as in DOS. The label must start with a colon (:) and exist on its own line in the batch file.

BE GOTO differs from the DOS batch file command GOTO in that it only works with Batch Enhancer script files.

BE JUMP

Conditional branching inside Batch Enhancer script files, based on the exit code (errorlevel) of the previous command.

```
BE JUMP label1 [, label2 [, ..., labeln]]
  [/DEFAULT:label]
```

label — A valid label that appears in the script file.

/DEFAULT:label — The label to branch to if the exit code is zero, or if the exit code is greater than the number of labels supplied.

BE uses the exit code as an offset into the series of labels. Execution continues at the appropriate label.

The BE JUMP command only appears in Batch Enhancer script files. It has no meaning if executed directly from DOS.

BE MONTHDAY

Return the day of the month (1 to 31) to the batch file as an exit code (errorlevel).

```
BE MONTHDAY [/DEBUG]
```

/DEBUG	Display the errorlevel value returned.

The exit code can be tested with the DOS IF ERRORLEVEL command or the BE JUMP command to branch to another location in the batch file.

BE PRINTCHAR

Display a specified character a given number of times at the current cursor location.

```
BE PRINTCHAR character count [color]
```

character	Character to display.
count	Number of times to display the character (up to 80).
color	Screen Attribute (SA) format color specification for the character (see BE SA).

BE REBOOT

Restart the computer without turning off the power.

```
BE REBOOT [/VERIFY] [/COLD]
```

/VERIFY	Prompt the user to confirm the reboot.
/COLD	Restart the computer without prompting.

BE ROWCOL

Position the cursor at the specified row and column location and optionally display text.

```
BE ROWCOL row col ["text"] [color]
```

row	Row number to move the cursor to.

col	Column number to move the cursor to.
text	Optional line of text to display. Must be enclosed in double quotation marks.
color	Screen Attribute (SA) format color specification for the text (see BE SA).

BE SA

Control the display of screen attributes and colors.

```
BE SA NORMAL | UNDERLINE | REVERSE [/N]
BE SA [BRIGHT | BLINKING | BOLD] foreground
  [ON background] [/N] [/CLS]
```

NORMAL	Use to undo an underline or reverse setting.
UNDERLINE	Only available on monochrome monitors (will be blue foreground on a color monitor).
REVERSE	Switch foreground and background colors.
BRIGHT	Use a high intensity of the selected color.
BLINKING	Make the color blink.
BOLD	For monochrome monitors.
foreground	Foreground color (see the color list below).
background	Background color (see the color list below).

WHITE BLACK RED MAGENTA
BLUE GREEN CYAN YELLOW

/N	Do not set the border color (the border normally defaults to same color as the background).
/CLS	Clear the screen after setting the attributes.

ANSI.SYS must be loaded in the CONFIG.SYS file to use the BE SA command.

NOTE: Several of the other Batch Enhancer commands use the same format to specify colors as BE SA, but do not go through ANSI.SYS.

BE SHIFTSTATE

Report the status of the Shift keys, the Alt key, and the Ctrl key.

```
BE SHIFTSTATE [/DEBUG]
```

/DEBUG	Display the errorlevel value returned.

The SHIFTSTATE command returns an exit code (errorlevel) that defines the status of the Left Shift key, Right Shift key, Alt key, and Ctrl key when you run it. SHIFTSTATE returns the following exit codes for the four keys, which can be added together for multiple keys:

1 Right Shift key

2 Left Shift key

4 Ctrl key (left or right)

8 Alt key (left or right)

You can test the exit code with the DOS IF ERRORLEVEL command.

BE TRIGGER

Halt execution of a batch file until the specified time.

```
BE TRIGGER hh:mm [AM | PM]
```

hh:mm	Time in 24-hour format (0:00 to 23:59).
AM | PM	Optionally, specify time in 12-hour format.

BE WEEKDAY

Return the day of the week to the batch file as an exit code (errorlevel).

```
BE WEEKDAY [/DEBUG]
```

/DEBUG	Display the errorlevel value returned.

Sunday is returned as 1, and Saturday is returned as 7. You can test the exit code with the DOS IF ERRORLEVEL command or the BE JUMP command.

BE WINDOW

Draw a solid rectangle with a double-line border, optionally using a drop shadow and a zoom effect.

```
BE WINDOW top left bottom right [color] [ZOOM
  | EXPLODE] [SHADOW]
```

top	Row number for upper-left corner of box.
left	Column number for upper-left corner of box.
bottom	Row number for lower-right corner of box.
right	Column number for lower-right corner of box.
color	Screen Attribute (SA) format color specification for the window (see BE SA).
ZOOM	Zooms the window while drawing it (EXPLODE is a synonym).
SHADOW	Adds a see through drop "shadow" to the window.

This command creates solid filled boxes that overwrite any overlapping text.

CALIBRAT (Calibrate)

Optimize the speed and reliability of a hard disk.

```
CALIBRAT [drive:] [/BATCH] [/BLANK] [/NOCOPY]
  [/NOFORMAT] [/NOSEEK] [/PATTERN:n]
  [/R[A]:pathname] [/X:drives]
```

drive:	Drive letter of disk to optimize.
/BATCH	Skip all prompts and exit to DOS when done. Use this switch when running Calibrate in a batch file.

/BLANK	Blank the screen while performing pattern testing.
/NOCOPY	Don't make a duplicate copy of the track currently being tested.
/NOFORMAT	Perform pattern testing only, do not (low-level) format the disk.
/NOSEEK	Skip seek tests. These need to be run only the first time you use Calibrate.
/PATTERN:n	Perform *n* number of test patterns (you may use 0, 5, 40, or 80).
/R[A]:pathname	Send (or Append) report of results to a file.
/X:drives	Exclude drives from testing (for example, /X:def).

Because Calibrate can change the low-level formatting of your hard disk (including the hard disk interleave), you should run the program in full-screen mode the first time you use it. Use the command-line switches for running periodic maintenance checks of your hard disk after this initial calibration.

DISKEDIT or DE (Disk Editor)

View and edit files and disk system areas.

```
DISKEDIT [drive:] [path] [filename] [/M]
  [/X:drives] [/W] [/SKIPHIGH]
```

drive:	Drive letter of disk to view or edit.
path	Path of directory to view or edit.
filename	File to view or edit.
/M	Maintenance mode: bypasses DOS and looks directly at the disk.
/X:drives	Exclude drives from absolute sector processing (for example, /X:def).
/W	Enable write mode (turn read-only off).
/SKIPHIGH	Do not load into high memory.

If you specify /M on the command line, Disk Editor accesses the diagnostic cylinder of the specified or current physical hard disk, but no network drives. If the diagnostic cylinder is present, Disk Editor allows you to access it.

DISKMON (Disk Monitor)

Enable or disable disk protection features: Disk Protect, Disk Light, and Disk Park.

```
DISKMON [/LIGHT+ | -] [/PROTECT+ | -]
  [/SKIPHIGH]

DISKMON [/PARK] | [/STATUS] | [/UNINSTALL]
```

/LIGHT+ | -	Turn the Disk Light on or off.
/PROTECT+ | -	Turn the Disk Protect features on or off.
/SKIPHIGH	Do not load into high memory.
/PARK	Park the disk heads on all drives.
/STATUS	Show the on/off status of Disk Protect and Disk Light.
/UNINSTALL	Remove Disk Monitor from memory.

You can configure Disk Monitor for different levels of file protection (files, system area, and entire disk). You must use the full-screen mode to set or store this configuration. The defaults are stored in the DISKMON.INI file.

DISKREET (Diskreet)

Encrypt and decrypt individual files or use encrypted areas (NDisks) on your disk. You must create, delete, or modify NDisks in full-screen mode.

NOTE: Because the NDisk option of Diskreet requires a device driver, be sure to read Chapter 12, "Diskreet (DISKREET)," and the Norton Utilities READ.ME file before loading it from the command line.

```
DISKREET [/ON | /OFF | /CLOSE]

DISKREET /SHOW[:drive] | /HIDE[:drive]
```

```
DISKREET [/E:pathname [/P:string] /T:target]
DISKREET [/D:pathname [/P:string]]
```

/ON	Enable the Diskreet device driver.
/OFF	Disable the Diskreet device driver.
/CLOSE	Close all open NDisks.
/SHOW[:drive]	Show NDisks (clears the hidden attribute) for the specified drive. If a drive is not specified, the default drive is assumed.
/HIDE[:drive]	Hide NDisks (sets the hidden attribute) for the specified drive. If a drive is not specified, the default drive is assumed.
/E:pathname	Encrypt the specified file or files.
/D:pathname	Decrypt the specified file.
/P:string	Specify a password for the file encryption and decryption (from 6 to 40 characters).
/T:target	Specify name of encrypted file.

To use NDisks, the Diskreet device driver must be loaded from your CONFIG.SYS file when you start your computer. The syntax for CONFIG.SYS is as follows:

```
DEVICE=DISKREET.SYS [/SKIPHIGH] [/NOHMA]
    [/A20ON]
```

/SKIPHIGH	Keep Diskreet from loading itself into high memory.
/NOHMA	Keep Diskreet from using the High Memory Area, and leave it free for Microsoft Windows or other programs.
/A20ON	This switch should be used in special cases, such as if you are encountering problems with your network drive or are losing characters during serial communications.

DISKTOOL (Disk Tools)

Disk Tools can be operated in full-screen mode only. Using the command-line switches you can start the program with a preselected operation.

```
DISKTOOL [/DOSRECOVER | /MAKEBOOT |
  /MARKCLUSTER | /REVIVE] [SKIPHIGH]
```

/DOSRECOVER	Recover from DOS RECOVER.
/MAKEBOOT	Make a disk bootable.
/MARKCLUSTER	Mark a cluster.
/REVIVE	Revive a defective floppy disk.
/SKIPHIGH	Do not load into high memory.

Rescue disk functions now have their own utility, called Rescue Disk.

DS (Directory Sort)

Sort the directory order of files by name, extension, date, time, and size.

```
DS [pathname]
DS N | E | D | T | S [pathname] [/S]
```

pathname	Directory to be sorted.
N	Sort by name.
E	Sort by extension.
D	Sort by date.
T	Sort by time.
S	Sort by size.
/S	Sort subdirectories.

Add a minus sign (-) to any of the sort keys to reverse the order. You can specify more than one key for the sort order.

If you do not specify a sort key, Directory Sort runs in full-screen mode.

NOTE: If NDOS is the primary shell, the NDOS sort function from DIRCMD /O: must be disabled to save the new order.

DUPDISK or DD (Duplicate Disk)

Copy a floppy disk to another disk in one pass.

```
DUPDISK [source-drive: [target-drive:]]
```

source-drive:	Drive for the disk you want to copy. If you omit the target drive, Duplicate Disk assumes the same drive for both disks.
target-drive:	Drive for the disk to copy the files to. If you're using the same drive for both disks, you don't need to specify a target drive.

FA (File Attributes)

Display, set, or clear the attributes of files and directories.

```
FA [pathname] [/A[+ | -]] [/R[+ | -]] [/HID
  [+ | -]] [/SYS[+ | -]] [/CLEAR] [/P] [/S]
  [/T] [/U]

FA [pathname] [/DIR[+ | -]]
```

pathname	Name of directory or files to display or change. The default is all files in the current directory.
/A[+ | -]	Display or set the archive attribute.
/R[+ | -]	Display or set the read-only attribute.
/HID[+ | -]	Display or set the hidden attribute.
/SYS[+ | -]	Display or set the system attribute.
/CLEAR	Clear (remove) all file attributes.
/P	Pause after each screen display.
/S	Include files in subdirectories.
/T	Display file or directory totals only.

/U	Display files that have at least one attribute set.
/DIR[+ | -]	Display or hide directories only.

Using an attribute switch by itself displays all files with that attribute set. If you specify more than one attribute, only files with all specified attributes are listed. To set an attribute, add a plus (+) sign. For example, /HID+ sets the hidden attribute for all specified files. To clear an attribute, add a minus (-) sign. If the pathname is omitted, the current directory is assumed.

FD (File Date)

Change file time and date information.

```
FD pathname [/D[[:]date]] [/T[[:]time]]
  [/P] [/S]
```

pathname	File specification of files to change.
/D [[:]date]	Set the date (month-day-year).
/T [[:]time]	Set the time (hour:minute:second). Only the hour is required.
/P	Pause after each screen.
/S	Include files in subdirectories.

Running File Date without the /D and /T switches will stamp the current date and time on all files specified in the pathname.

FILEFIND or FF (File Find)

Locate lost files, directories, or data; update the date stamp, time stamp, and attributes of a file or group of files; search for and optionally replace specific text in a file or group of files.

```
FILEFIND [pathname] [search text] [replace
  text] [/C] [/CS] [/S] [/BATCH] [/A[+ | -]]
  [/HID[+ | -]] [/R[+ | -]] [/SYS[+ | -]]
  [/CLEAR] [/D[[:]date]] [/T[[:]time]] [/NOW]
  [/O:pathname] [/TARGET:drive]
```

pathname	The file specification for the search. Note the following additional special usages of wildcards with FileFind:

	. Search entire current drive
	.*.* Search current directory
	:.* Search all drives
search text	Text to search for in files. If search-text contains spaces and/or commas, the entire search text must be enclosed in double quotation marks.
replace text	Text to replace in files. If replace-text contains spaces and/or commas, the entire replace text must be enclosed in double quotation marks.
/C	Same as .*.* (searches current directory).
/CS	Case sensitive search.
/S	Include files in subdirectories.
/BATCH	Automatically exit program on completion.
/A[+ | -]	Files with archive attribute set. Optionally set or clear archive attribute.
/HID[+ | -]	Hidden files. Optionally set or clear hidden attribute.
/R[+ | -]	Read-only files. Optionally set or clear read-only attribute.
/SYS[+ | -]	System files. Optionally set or clear system attribute.
/CLEAR	Clear (remove) all file attributes.
/D[[:]date]	Set the date (month-day-year).
/T[[:]time]	Set the time (hour:minute:second).
/NOW	Set the date and time to the current date and time.
/O:pathname	Save the list of files that match the file specification to the specified ouput file.
/TARGET:drive	Test if specified files will fit on a target drive.

If you specify /D or /T and omit the date or time, File Find sets the file date to 0-0-80 and clears the time.

FILEFIX (File Fix)

Diagnose and repair problems in damaged Lotus 1-2-3, Symphony, Quattro Pro, Excel, dBASE, Clipper, or WordPerfect data files.

```
FILEFIX [pathname]
```

pathname	File specification of file to be fixed. File Fix determines the application type from the file extension, unless it's a WordPerfect file.

Although File Fix performs much of the repair work automatically, it still requires user interaction in full-screen mode. For this reason, your only command-line option is the name of the file to repair.

FL (File Locate)

Locate lost files or directories, or display a file catalog of the entire disk.

```
FL [drive:] [filename] [/A] [/P] [/W] [/T |
  /E:name] [/F[n]]
```

drive:	Drive to search for file (if omitted, the default drive is assumed).
filename	File or directory to search for (use the * and ? wildcard characters also). If omitted, all files are listed.
/A	Search for files on all drives.
/P	Pause after each screen display.
/W	List files in a wide format.
/T	Limit search to directories in the PATH statement.
[/E:name]	Limit search to directories specified in the specified environment variable only.
/F[n]	Find the first *n* files that match the search filename (default number of matches is 1).

File Locate also finds and displays hidden and system files.

FS (File Size)

Display the size of one or more files to determine if they will fit on another disk drive.

```
FS [pathname] [target drive:] [/P] [/S] [/T]
```

pathname	File specification or directory.
target drive:	Drive to test for enough space for files.
/P	Pause after each screen display.
/S	Include files in subdirectories.
/T	Display directory total number of bytes and files (summary information) only.

IMAGE (Image)

Save the boot record, file allocation table (FAT), and root directory information to a file named IMAGE.DAT for future disk and file recovery.

```
IMAGE [drive:] [/NOBACKUP] [/OUT]
```

drive:	Save information for the specified drives. If omitted, save information for the current drive only.
/NOBACKUP	Overwrite the current IMAGE.DAT file without creating the backup file, IMAGE.BAK.
/OUT	Display no update messages.

LP (Line Print)

Print a text file on a printer or send to a file.

```
LP pathname [output] [/CONFIG:name] [/Tn]
  [/Bn] [/Ln] [/Rn] [/HIn] [/Wn] [/TABn]
  [/SPn] [/PAn] [/N] [A/] [/80 | /132]
  [/HEADERn] [/WS | /EBCDIC] [/PR:xx]
  [/SET:pathname]
```

pathname	Drive, directory, and filename of text file to be printed.

output	Device (such as LPT1) or filename to output to (default is PRN).
/CONFIG:name	Printer configuration description. You can create configurations with Norton Utilities Configuration. If your description contains spaces (two or more words), enclose it in double quotation marks.
/Tn /Bn /Ln /Rn	Top, bottom, left, and right margins (defaults are 3, 3, 5, and 5).
/HIn /Wn	Height, width of page (defaults are 66 and 85). Use /H60 to set lines per page on a laser printer.
/TABn	Tab spacing (default is 8).
/SPn	Line spacing (default is 1).
/PAn	Starting page number (default is 1). Page numbering is independent from the printing pages so you cannot use this switch to print a specific page. In other words, the starting number you specify goes on the first printed page, which is usually the first page of the document.
/N	Turn line numbering on.
/A	Append to output file.
/80 | 132	80- or 132-column print width (IBM compatible printers).
/HEADERn	Type of header (0, 1, or 2): 0 No header 1 Current date and time on one line (default) 2 Current date and time plus file date and time on two lines
/EBCDIC	Print EBCDIC files.
/WS	Print WordStar files.

/PR:xx	Generate output for a specific printer. The type *xx* can be TTy, GEneric, EPson, PRoprinter, QUietwriter, TOshiba, LAserJet, or POstScript.
/SET:pathname	File with printer setup string.

NOTE: Use the plus (+) and minus (-) signs to turn the /n, /80, /132, /EBCDIC, and /WS switches on or off, respectively. If you omit the + or -, + is assumed.

The setup string in the file specified by /SET uses any literal characters plus special characters in the following format (note that you must precede these characters with a backslash, not a forward slash):

\nnn	ASCII codes: *nnn* is the decimal number for the code you wish to send. You must use three digits; use leading zeros as necessary (for example, \013\010 is a carriage return and line feed). You can find a list of the decimal codes in your printer manual.
\C	Control codes: C is the control character you wish to send (for example, \A is Ctrl+A).
C	Any literal character you want to send to the printer.

NCACHE2 (Norton Cache)

Create a memory buffer to speed up disk reading and writing.

```
NCACHE2 [install switches] [[drive:] [drive
  switches]]

NCACHE2 [reconfigure switches] [[drive:]
  [drive switches]]
```

Install Switches:

/INSTALL	Install cache with default values.

/OPTIMIZE=S | E | M
: Optimize cache for Speed, Efficiency, or Memory (default is Speed). You can spell out these settings if you want.

/DOS[=[-]n]
: Specify DOS memory to use for cache. If *n* (kilobytes) is omitted, default is 128K. Optionally, a negative value is the amount of memory to reserve for applications while the remainder is for the cache.

/EXT[=[-]n[,m]]
: Extended memory to use for cache. If you omit *n* (kilobytes), see Chapter 22 "Norton Cache (NCACHE2)" to find out how much memory the cache will take. Optionally, a negative value is the memory to reserve for applications while the remainder is for the cache. The minimum extended memory to reserve for the cache when running Microsoft Windows 3.x in enhanced mode (defaults to same value as *n*) is *m*.

/EXP[=n]
: Expanded memory to use for cache. If you omit *n* (kilobytes), see Chapter 22 "Norton Cache (NCACHE2)" to find out how much memory the cache will take. Optionally, a negative value is the memory to reserve for applications while the remainder is for the cache. Microsoft Windows 3.x is not compatible with expanded memory caches. It disables expanded memory caches

/BLOCK=n
: Cache block size: 512, 1024, 2048, 4096, or 8192 bytes (default is 8192 bytes unless you specify /OPTIMIZE=efficiency).

/USEHIGH=on | off
: Use high DOS memory to maximize available memory (default is on).

/USEHMA=on | off
: Use HMA to maximize available DOS memory (default is on).

/READ=n — Maximum size for the read-ahead buffer is from 8K to 64K in 1K increments (default is 8K unless you specify / OPTIMIZE=memory). A value of 0 disables the read-ahead buffer.

/WRITE=n — Maximum size for the IntelliWrites buffer is from 8K to 64K in 1K increments (default changes with the /OPTIMIZE setting). A value of *n* equals 0 disables the IntelliWrites buffer.

/INI=pathname — Specify the Norton Cache initialization file.

Reconfigure Switches:

/RESET — Reset entire cache (cannot be used with a drive designator).

/UNINSTALL — Uninstall Norton Cache from memory.

/SAVE — Save current cache configuration in the file specified with the /INI switch. If /INI was not specified, the configuration is saved in NCACHE.INI in the directory from which the Norton Cache was loaded.

/DELAY=ss.hh — Specify delay for the IntelliWrites: ss for seconds, hh for hundredths (default is 1 second unless /OPTIMIZE=memory).

/QUICK=on | off — Return DOS prompt back quickly after writing (default is on). With /QUICK=off, wait until all deferred writes are done before returning the DOS prompt.

/REPORT[=on | off] — Display complete Norton Cache status information.

/STATUS[=on | off] — Display brief Norton Cache status information.

Drive Switches:

/[-]A — Activate or deactivate cache for specified drives. Default is activated for all drives except A: and B:.

/[-]C	Enable or disable caching subsequent data for specified drives. Default is enable for all drives.
/[-]I	Enable or disable IntelliWrite support for specified drives. Default is enable for all drives except A: and B:.
/[-]W	Enable or disable cache write-through for specified drives. Default is enabled for all drives.
/[-]P	Enable or disable write protection for specified drives. Default is disabled for all drives.
/R[=[D][n]]	Limit sector read-ahead for specified drives. The D option enables read-ahead only for sequential disk reads. The amount of data to read is *n*, specified in 1K increments (default is D8).
/G=n	Limit caching of group sector reads for specified drives (default is 128).
/F	Flush cache of data for specified drive(s). /F can only be specified as a reconfigure option.

CAUTION: In certain situations, Norton Cache must be loaded using a specific method to prevent accidental data loss. Refer to Chapter 22, "Norton Cache (NCACHE2)," for complete information regarding Norton Cache installation, usage, defaults, and configuration.

NCC (Norton Control Center)

Customize many of your PC's hardware settings, including mouse speed, serial port configuration, video mode, color palettes, and country codes. Also, run up to four stopwatches.

```
NCC [pathname [/SET]]

NCC [pathname [/CURSOR | /DOSCOLOR |
  /PALETTE]]
```

```
NCC [/FAST] [/BW80 | /CO80] [/nn]

NCC [/START[:watch] | /STOP[:watch]] [/L] [/N]
  [/C:comment]
```

pathname	File containing all Norton Control Center settings.
/SET	Set all the options stored in pathname.
/CURSOR	Set the cursor size from the specified file.
/DOSCOLOR	Set the DOS color from the specified file.
/PALETTE	Set the palette information from the specified file.
/FAST	Set the keyboard to its fastest rate.
/BW80	Set display mode to black and white, 25 x 80.
/CO80	Set display mode to color, 25 x 80.
/nn	Set the number of lines for EGA (25, 35, or 43) or VGA (25, 40, or 50).
/START[:watch]	Start stopwatch number *watch* (default is 1, range is 1 through 4).
/STOP[:watch]	Stop stopwatch number *watch* (default is 1, range is 1 through 4).
/L	Display current time and date on left side of screen.
/N	Do not display current time and date.
/C:comment	Display a comment on the screen when Norton Control Center is executed; this is useful when you are running multiple stopwatches from batch files. If a comment includes spaces or commas, enclose the entire comment within double quotation marks.

Although the Norton Control Center settings are selectable only through the full-screen mode, you can specify a file to save all settings and then load all the settings from the command line with /SET, or a single setting with /CURSOR, /DOSCOLOR, or /PALETTE. If you specify a setting command without a pathname, Norton Control Center runs in full-screen mode.

NCD (Norton Change Directory)

Go to any directory without having to type the entire pathname. Create or remove directories and prune and graft branches of the directory tree.

```
NCD [drive:][directory] [/N] [/R]

NCD [drive:] /L[:pathname] [/A] [/P] [/G |
  /NG | /T]

NCD [drive:] /V[:label]

NCD RMTREE [/BATCH] | MD | RD | SIZE
  directory

NCD COPY [/DELETE] | GRAFT source destination
```

drive:	Drive letter of drive containing directory.
directory	The directory name. You only need to specify the end-point directory, not the whole path.
/N	Do not write or update the TREEINFO.NCD file. Useful on write-protected volumes in conjunction with /R.
/R	Rescan the disk directory (update the TREEINFO.NCD file).
/L[:pathname]	List directories, optionally sending output to a file.
/A	List directories of all drives.
/P	Pause after each screen display.
/G	Display the directory tree graphically.
/NG	Suppress printing extended IBM characters.
/T	Display the total number and size of all files in each directory.
/V:label	Place a volume label on the disk using uppercase and lowercase characters or embedded spaces (surround the label with quotation marks).

RMTREE	Remove a branch of the directory tree.
/BATCH	Skip all prompts and exit to DOS when the procedure is done.
MD directory	Create a directory and add it to the Norton Change Directory tree. (Do not use a \ unless you want the directory created in the root directory.)
RD directory	Remove the named directory both from the disk and the Norton Change Directory tree. (Do not use a \ before the directory name unless you mean a directory off the root directory.)
SIZE	Display the size of a branch of the directory tree.
COPY	Copy a branch of the directory tree (source) to another location (destination).
/DELETE	Remove the branch after the copy is completed. Use NCD COPY with /DELETE to move branches of the directory tree across drives.
GRAFT	Move a branch of the directory tree (source) to another location (destination).
source	The directory name of the directory tree to copy or graft.
destination	The directory to receive a copied or grafted branch of the directory tree.

Your directory structure is stored in TREEINFO.NCD in the root directory. (On network drives it may be in the NCDTREE directory.) You need to configure Norton Change Directory to enable copying and deleting directories.

NDD (Norton Disk Doctor)

Diagnose and repair disks that are damaged or defective, or perform routine diagnostics and inspection to prevent such problems from developing.

```
NDD [drive:] [drive:]... [/C | /Q | /DT]
  [/R[A]:pathname] [/X:drives] [FIXSPACES]
  [/NOCOMP] [/NOHOST] [/SKIPHIGH]

NDD [drive:] [drive:]... [/REBUILD]
  [/SKIPHIGH]

NDD [drive:] [drive:]... [/UNDELETE]
  [/SKIPHIGH]

NDD /UNDO [/SKIPHIGH]
```

drive:	Disk drive to diagnose or repair. You can specify more than one drive.
/C	Complete: test the partition table, boot record, root directory, lost clusters, and perform a surface test.
/Q	Quick: perform all tests except the surface test.
/DT	Only perform the surface test.
/R[A]:pathname	Write (or append) a report of all tests performed to the specified file.
/X:drives	Exclude drives from testing (for example, /X:def).
/FIXSPACES	Repair filenames with embedded spaces.
/NOCOMP	Do not test compression structures.
/NOHOST	Do not test host drive of compressed volumes.
/REBUILD	Rebuild an entire disk that has been destroyed.

/UNDELETE	Undelete a DOS partition that was previously skipped. (For example, Norton Disk Doctor detected an old DOS partition and asked if you wanted to undelete it. If you responded "no," this switch allows you to go back and undelete it.)
/UNDO	Undo repairs made in a prior session.
/SKIPHIGH	Do not load into high memory.

When using Norton Disk Doctor to diagnose and repair a problem disk, the full-screen mode offers more information for your choices. Use the command-line switches for routine maintenance or commands in startup files, such as a diagnosis of your disk every time you start your computer.

NDIAGS (Norton Diagnostics)

Test your computer's system hardware.

```
NDIAGS /AUTO:n [/REP:file]
NDIAGS /SPEC:file1 [/REP:file2]
NDIAGS /RESET | /COMP
NDIAGS /BURNIN:x [/SPEC:file1] [/REP:file2]
```

/AUTO:n	Automatically cycle through all non-interactive tests and delay *n* seconds between tests.
/REP:file	Print a report to the specified file.
/SPEC:file	Use the specified file for report settings.
/COMP	Run only the comprehensive memory test. Before running this test from the command line you must restart your computer using empty CONFIG.SYS and AUTOEXEC.BAT files. When in full-screen mode, Norton Diagnostics changes these files and restarts your computer automatically.

/RESET	Reset the configuration stored in NORTON.INI. Perform this reset if you change your hardware setup.
/BURNIN:x	Automatically perform all non-interactive tests *x* times. If you include /SPEC, NDIAGS runs the tests specified in the specified file.

NDOSHELP (NDOS Help)

Get online help for NDOS commands.

```
NHELP [topic]
```

topic	Name of topic or command for which you need help.

NORTON (Norton Program)

Access all of the Norton Utilities from a full-screen menu with descriptions of each of the programs.

```
NORTON [/BW | LCD] [/G0] [/M0] [/NOZOOM]
```

/BW	Use only the black-and-white color set.
/LCD	For laptop displays. Use the LCD color set.
/G0	Disable font redefinitions and graphical mouse.
/M0	Disable graphical mouse.
/NOZOOM	Disable dialog box zooming.

RESCUE (Rescue Disk)

Create a unique rescue disk for your system and restore from this disk if your system crashes.

```
RESCUE [/CREATE[:pathname]] [/SKIPHIGH]
RESCUE [/RESTORE[:pathname]] [/SKIPHIGH]
```

pathname	Drive and directory for rescue files.
/CREATE	Create a rescue disk.

/RESTORE	Restore your computer from a rescue disk.
/SKIPHIGH	Do not load into high memory.

The Rescue Disk functions were provided by the Disk Tools utility in prior versions of the Norton Utilities. The installation program gives you the opportunity to create a rescue disk as well.

SFORMAT or SF (Safe Format)

Safely and quickly format a disk.

```
SFORMAT [drive:] [/A] [/B | /S] [/D | /Q]
  [/U] [/V:label] [/1] [/4] [/8] [[/N:n]
  [/T:n] | [/F:size]]
```

drive:	Drive letter of disk to format.
/A	Automatic mode: do not pause during operation or open any dialog boxes. Return to DOS when done.
/B	Leave space for system files on the disk.
/S	Copy system files to the disk you are formatting.
/D	Use DOS Format mode (same as the DOS FORMAT command).
/Q	Use Quick Format mode (reinitialize system area only).
/U	Unconditional format. Give no warnings about existing data.
/V:label	Place specified volume label on the disk.
/1	Format for single-sided use.
/4	Format a 360K floppy disk in a 1.2 MB drive.
/8	Format eight sectors per track.
/N:n	Number of sectors per track (8, 9, 15, 18, or 36).

/T:n	Number of tracks (40 or 80).
/F:size	Size of floppy disk (360, 720, 1200, 1440, or 2880 kilobytes).

You can specify the size parameter in several different units. For example, 1200 bytes can be entered as 1200, 1200K, 1200KB, 1.2, 1.2M, or 1.2MB. You can omit the "F:"—just specify the size (for example, /720).

You cannot use /N:n or /T:n with /F:size.

You can set a default configuration that Safe Format can use in full-screen mode. If you don't use the /A switch, Safe Format defaults to full-screen mode.

SMARTCAN (SmartCan)

Protects data by saving the location information of erased files to a SMARTCAN directory (a protected area of the disk) for future recovery if needed.

```
SMARTCAN [/CONVERT]

SMARTCAN [/OFF | /UNINSTALL]

SMARTCAN [/ON [/SKIPHIGH]]

SMARTCAN [/STATUS]
```

/CONVERT	Search for and convert Erase Protect trash cans, which are directories from the older version of this utility, to SmartCan trash cans.
/OFF	Disable SmartCan (same as /UNINSTALL).
/ON	Enable SmartCan.
/SKIPHIGH	Do not load into high memory.
/UNINSTALL	Uninstall SmartCan (same as /OFF).
/STATUS	Display SmartCan protection status.

You must use the full-screen mode to specify such things as how many days to keep files before overwriting them, how much disk space to allow for these files, and how often to purge the SmartCan directory.

SPEEDISK or SD (Speed Disk)

Improve hard disk performance and speed up disk-access time by consolidating and unfragmenting the data on your disk.

```
SPEEDISK [drive:] [/F | /FD | /FF] [/Sorder]
  [/V] [/B] [SKIPHIGH]
SPEEDISK [drive:] [/Q | /U] [/V] [/B]
  [SKIPHIGH]
```

drive:	Drive letter of disk to optimize.
/B	Restart the computer after optimization.
/F	Full optimization.
/FD	Full optimization in the directory order specified in the Configuration menu.
/FF	Full optimization in the file order specified in the Configuration menu.
/Q	Unfragment free space (quick compress optimization).
/U	Unfragment files only.
/V	Verify sector read after writing data to disk.
/SKIPHIGH	Do not load into high memory.
/S	Sort files in the specified order.
order	One of the following: D Date and time E Extension N Name S Size Add a minus (-) sign to the specified order to reverse the sort.

When using Speed Disk for the first time, use the full-screen mode to set and store the Speed Disk configuration. Use the command-line switches to perform quick optimizations for routine maintenance.

SYSINFO or SI (System Information)

Display system configuration information and performance statistics.

```
SYSINFO [/AUTO:n] [/N] [/NOHDM] [/SOUND]
SYSINFO [drive:] [/DI | /SUMMARY]
SYSINFO [/DEMO | /TSR]
SYSINFO /REP:file1 [/SPEC:file2]
```

drive:	Drive on which you want information (if omitted, the default drive is assumed).
/AUTO:n	Automatically cycle through all information screens, pausing *n* seconds between each screen.
/N	No memory scan: bypass the test that probes currently used memory. Use this switch if, when System Information attempts to probe memory that does not exist, the computer reports a parity error and "locks up." This situation does not harm your computer, but it does require you to restart it.
/NOHDM	Do not detect the hard drive model.
/SOUND	Beep between CPU tests.
/DI	Drive information: summary screen only.
/SUMMARY	System information: summary screen only.
/DEMO	Demo mode: cycle through the benchmark tests and summary screen only.
/TSR	Display list of TSR programs.
/REP:file1	Output a report to the specified file.
/SPEC:file2	Use the specified report settings.

Specifying SI alone starts System Information in full-screen mode.

TS (Text Search)

Search for text or data in one or more files, across an entire disk, or across the erased file space of a disk.

```
TS [pathname] [search-text] [/S] [/T] [/A]
  [/CS] [/EBCDIC] [/LOG [> filename | PRN]]
  [/WS]

TS [drive:] [search-text] /D | /E [/Cn] [/A]
  [/CS] [/EBCDIC] [/LOG [> filename | PRN]]
  [/WS] [/F:pathname]
```

pathname:	Directory and name of file to search.
search-text	Text to search for. Use double quotation marks around the string if it contains embedded spaces.
/S	Include subdirectories in the search.
/T	Display non-interactive directory summary information.
/D	Search the entire disk.
/E	Search only the erased file space of the disk.
/Cn	Start searching at cluster *n*.
/A	Automate search (answer "yes" to all prompts).
/CS	Case sensitive search.
/EBCDIC	Files being searched are encoded in EBCDIC.
/LOG	Format output for a LOG suitable for a printer or a file.
>filename	Redirect logged search information to a file.
>PRN	Redirect logged search information to your printer with the DOS PRINT command.
/WS	Specifies that characters in the IBM PC extended character set not be considered in the search.
/F:pathname	Save to specified output file to hold disk clusters.

UNERASE (UnErase)

Automatically recover erased (deleted) files.

```
UNERASE [pathname] [/IMAGE | /MIRROR |
  /NOINFO] [/NOTRACK] [/SKIPHIGH]

UNERASE [pathname] [/PROTECTED | /NOPROTECTED]
  [/SKIPHIGH]
```

pathname	Directory and/or name of file to recover.
/IMAGE	Use Image recovery information (exclude Mirror information).
/MIRROR	Use Mirror recovery information (exclude Image information).
/NOTRACK	Exclude DOS delete tracking information.
/NOINFO	Exclude both Mirror and Image disk information.
/PROTECTED	Only recover files protected by SmartCan or Delete Sentry.
/NOPROTECTED	Exclude files protected by SmartCan or Delete Sentry.
/SKIPHIGH	Do not load into high memory.

For badly fragmented or partially overwritten files you must use Manual UnErase in the full-screen mode.

UNFORMAT (UnFormat)

Recover a hard disk that has been accidentally formatted, corrupted by a power surge, or damaged by a virus.

```
UNFORMAT [drive:] [/IMAGE | /MIRROR]
```

drive:	Drive letter of disk to unformat.
/IMAGE	Use Image recovery information (excludes Mirror information).
/MIRROR	Use Mirror recovery information (excludes Image information).

UnFormat can make a near-perfect recovery if you have saved disk system information using the Image utility.

WIPEINFO (Wipe Information)

Completely destroy deleted data by overwriting the disk area where it was stored. Wipe Information conforms to government security specifications for wiping information.

WARNING: Data overwritten by Wipe Information cannot be recovered even with UnErase or UnFormat.

```
WIPEINFO [drive:] [/E] [/GOVn] [/Rn] [/Vn]
  [/BATCH]
WIPEINFO [pathname] [/N] [/K] [/S] [/GOVn]
  [/Rn] [/Vn] [/BATCH]
```

drive:	Drive letter of disk to wipe.
pathname	Directory and/or name of file to wipe.
/E	Wipe all erased and unused data space only. All current data is left untouched.
/N	Non-wiping mode: delete files, but do not wipe them.
/K	Wipe only the slack at the end of a file, and leave the file's data untouched.
/S	Wipe or delete files in subdirectories also.
/GOVn	Follow government specifications for security wiping. Optionally repeat pattern *n* times (default is 3).
/Rn	Repeat wiping *n* times (default is 1 for Fast Wipe and 3 for Government Wipe).
/Vn	Set the value to write onto the wipe area; *n* can be any number from 0 to 255 (default is 0 for Fast Wipe and 246 for Government Wipe).
/BATCH	Execute Wipe Information without prompt (for batch files).

For those settings that you do not specify, Wipe Information defaults to what you specified in the full-screen mode.

NDOS Commands

NDOS has more than 90 internal commands. Some commands are the same as the DOS COMMAND.COM commands, some have the same names as DOS commands but include enhanced functionality, and many are new. The following lists show which commands fall into each of these three categories.

Same

BREAK	DATE	TIME
CHCP	EXIT	VER
CTTY	GOTO	VERIFY

Enhanced

CALL	DEL	IF	PROMPT	RMDIR
CD	DIR	MD	RD	SET
CHDIR	ECHO	MKDIR	REM	SHIFT
CLS	ERASE	PATH	REN	TYPE
COPY	FOR	PAUSE	RENAME	VOL

New

?	ECHOS	LIST	SELECT
ALIAS	ENDLOCAL	LOADBTM	SETDOS
ATTRIB	ESET	LOADHIGH	SETLOCAL
BEEP	EXCEPT	LOG	SWAPPING
CANCEL	FREE	MEMORY	TEE
CDD	GLOBAL	MOVE	TEXT
COLOR	GOSUB	POPD	TIMER
DESCRIBE	HELP	PUSHD	TRUENAME
DELAY	HISTORY	QUIT	UNALIAS
DIRS	IFF	REBOOT	UNSET
DRAWBOX	INKEY	RETURN	VSCRPUT
DRAWHLINE	INPUT	SCREEN	Y
DRAWVLINE	KEYSTACK	SCRPUT	

NOTE: For more information on NDOS, refer to the readme file called NDOS.DOC.

The following three switches are still available when installing the NDOS shell to maintain compatibility with the DOS COMMAND.COM syntax.

/C command	Execute the specified command along with the shell installation.
/E:n	Set environment size to be *n*.
/P	Load shell permanently.

?

Display all internal NDOS commands.

```
?
```

For help with internal NDOS commands or external DOS commands, type `HELP` or press the F1 function key at the DOS prompt.

ALIAS

Define an alias. Load or display the alias list.

```
ALIAS [/P] [/R pathname1 [pathname2] [_]]
  [name[= value]]
```

/P	Pause display after each full screen and wait for a keystroke.
/R	Read and load an alias list from a file.
pathname	Files to read for alias definitions.
name	Alias name (up to 80 characters).
= value	Value can be any command sequence (up to 255 characters).

ALIAS by itself lists all aliases in effect. Specifying an ALIAS name alone displays the alias value.

ATTRIB

Change the file or subdirectory attributes.

```
ATTRIB [/D | /S | /Q] [+|-[A] [H] [R] [S]]
  pathname
```

/D	Directory: modify directory attributes.
/S	Include subdirectories.
/Q	Use quiet mode to suppress filename displays.
+|-A	Set or clear the archive attribute.
+|-H	Set or clear the hidden attribute.
+|-R	Set or clear the read-only attribute.
+|-S	Set or clear the system file attribute.

ATTRIB with just a pathname displays the attributes.

ATTRIB is an internal NDOS command. Refer to your DOS manual for information on using the external DOS ATTRIB command.

BEEP

Sound a tone through the speaker.

```
BEEP [frequency] [duration]
```

frequency	Specified in Hertz (default is 440 Hz).
duration	Specified in 1/18 second intervals (default is 2).

BREAK

Display, enable, or disable the Ctrl+C and Ctrl+BREAK interrupts that your computer checks for.

```
BREAK [ON | OFF]
```

ON	Enable extended Ctrl+C checking.

OFF	Disable extended Ctrl+C checking (default is off).

BREAK with no parameters displays status of extended Ctrl+C checking.

CALL

Call a secondary (nested) batch file from within another one.

```
CALL pathname
```

pathname	Filename and location of a secondary batch file.

You can call up to six levels of nested batch files.

CANCEL

Terminate batch file processing.

```
CANCEL [n]
```

n	The errorlevel value to return to the calling command processor.

The CANCEL command ends all batch file processing, regardless of the batch nesting level.

CD

See CHDIR.

CDD

Change the default drive and current directory. Similar to CD, but this command also changes the default drive if you specify one.

```
CDD [drive:]pathname
```

drive:	Drive to be made the default drive.
pathname	Directory to be made the current directory.

CHCP

Display or change the current code page to select a character set of a different language.

```
CHCP [n]
```

n	Country code page.

CHDIR or CD

Display or change the current directory.

```
CD | CHDIR [pathname]
```

pathname	Directory to be made the current directory.

CHDIR with no parameters reports the current directory of the default drive.

If you specify a drive in the pathname, CHDIR changes the current directory for that drive, but does not change the default drive. If you just specify a drive, CHDIR displays the current directory of that drive.

CLS

Clear the video display and optionally change the display to the specified colors.

```
CLS [[BRIGHT] [BLINK] fg ON bg [BORDER bc]]
```

BRIGHT	Display the selected color with high intensity.
BLINK	Make the screen blink.
fg	The foreground color (see the color list below).
ON	Command separating the foreground and background colors.
bg	The background color (see the color list below).

BORDER	Command introducing the border color.
bc	The border color (see the color list below).

Black Blue Green Red
Magenta Cyan Yellow White

COLOR

Set the screen display colors.

```
COLOR [[BRIGHT] [BLINK] fg ON bg [BORDER bc]]
```

BRIGHT	Display the selected color with high intensity.
BLINK	Make the screen blink.
fg	Foreground color (see the color list below).
ON	Command separating the foreground and background colors.
bg	Background color (see the color list below).
BORDER	Command introducing the border color.
bc	The border color (see the color list below).

Black Blue Green Red
Magenta Cyan Yellow White

COPY

Copy or append one or more files.

```
COPY [/C] [/H] [/M] [/N] [/P] [/Q] [/R] [/S]
  [/U] [/V] [source1] [+source2] [+source3]
  [+...] [/A] [/B] [target] [/A] [/B]
```

/C	Copy changed files only.
/H	Copy hidden files only.
/M	Copy those (modified) files that have the archive bit set. The archive bit does not go away after copying.

/N	Do virtually nothing. Perform all actions except the copy to view possible results of the copy.
/P	Prompt user for a confirmation before each file is copied.
/Q	Use quiet mode so filenames do not display as they are copied.
/R	Prompt before replacing an existing file.
/S	Copy subdirectory trees.
/U	Copy (update) only those source files that are newer than a matching target file, or where a matching target file does not exist.
/V	Verify that the data written to disk is physically readable.
source	The pathname that is the location of the source files. You can have several sources for files.
target	The pathname that is the destination of the files. If you don't specify a destination, the current drive and directory are assumed.
/A	ASCII: Copy a source file up to, but not including, the first Ctrl+Z character in the file. Or, copy a destination filename and add a Ctrl+Z to the end of the file.
/B	Binary: Copy the exact number of bytes in the source file. Or, do not add a Ctrl+Z to the end of the destination file.

You can copy several unrelated files to a destination directory with a single COPY command by using the + sign. If there are two or more file locations on the command line, COPY assumes the last location is the destination. If you specify more than one source file, and the destination is not a directory, COPY will automatically append the files to that file.

The default copy is /B for normal file copies. The default copy is /A when appending files. The /A or /B switch applies to the preceding filename and to all subsequent filenames on the command line or until you specify another /A or /B.

CTTY

Change the default console device.

```
CTTY device
```

device	Any device that can perform standard character I/O.

CTTY works only for those programs that use the standard MS-DOS I/O functions, including all the NDOS internal commands except DRAWBOX, DRAWHLINE, DRAWVLINE, LIST, SCREEN, SCRPUT, and SELECT.

DATE

Display or change the system date.

```
DATE [mm-dd-yy]
```

mm	Month: specify a number between 1 and 12.
dd	Day: specify a number between 1 and 31.
yy	Year: specify a number between 80 and 99 (1980 to 1999) or 2000 to 2099.

DEL or ERASE

Delete one or more files from the disk.

```
DEL | ERASE [/N] [/P] [/Q] [/S] [/X] [/Y]
  [/Z] pathname
```

/N	Do virtually nothing. Perform all actions except the deletion to view possible results of the deletion.
/P	Prompt user for confirmation before each file deletion.

/Q	Use quiet mode so filenames do not display during deletion.
/S	Delete specified files in all subdirectories.
/X	Remove empty subdirectories.
/Y	Assume a "yes" response to all deletions.
/Z	Zap all files. Delete normal, hidden, system, and read-only files.
pathname	Specify a file specification to delete.

DELAY

Pause for a specified time.

```
DELAY [seconds]
```

seconds	Number of seconds to pause processing (default is 1 second).

DESCRIBE

Create, modify, or delete file and subdirectory descriptions.

```
DESCRIBE pathname ["description"]
```

pathname	A file specification or the name of a directory.
description	Up to 40 characters enclosed in double quotation marks for filenames or directories.

You can display descriptions when using DIR with the default, single column option, or when using SELECT.

Use wildcards (* and ?) and/or multiple filenames with a description on the command line to give all matching files the same description.

DIR

Display information about files and subdirectories.

```
DIR [/1 | /2 | /4] [/A[:]-rhsda] [/B | /F]
  [/C] [/C[H]] [/D] [/E] [/J] [/K] [/L] [/M]
  [/N] [/O[:]-acdeinsrgu] [/P] [/S] [/T] [/U]
  [/V | /W] [[pathname1] [pathname2] [...]]
```

/1 Display the filename, size, date, time, and description in a single column. This is the default.

/2 Display the filename, size, date, and time in two columns.

/4 Display the filename and size (in K or MB) in four columns.

/A Display filenames with specified attributes:

- r Read-only
- h Hidden
- s System
- d Directory
- a Archive
- \- A minus sign before the attribute means "not."

/B Suppress header line and summaries, and display file or subdirectory names only in a single, bare column.

/F Display the full path of each filename.

/C Display compression specifications for filenames, if applicable.

/C[H] Display file compression ratio; /CH uses host allocation unit size.

/D Disable colorization.

/E Display filenames in uppercase.

/J Display same columnar format as COMMAND.COM.

/K	Omit volume label and pathname information.
/L	Display filenames in lowercase (default for NDOS).
/M	Omit the total bytes information line.
/N	Reset DIR options to the normal, default values.
/O	Display filenames by specified sort order:

a	Standard ASCII
c	Compression ration (lowest first)
d	Date and time
e	Extension
i	File description (see DESCRIBE)
n	Name
r	Reverse sort order for *all* keys
s	Size
g	Group directories first
u	Unsorted (same as COMMAND.COM)
-	A minus sign before the sort key reverses that key's sort order.

/P	Pause display after each full screen and wait for a keystroke.
/S	Display contents of the current directory and all of its subdirectories.
/T	Display the filenames and attributes.
/U	Display summary information: number of files and bytes used.
/V	Sort filenames vertically rather than horizontally (with the /2, /4, or /W option).

/W	Sort filenames only in wide mode, horizontally across the screen. Wide mode is 5 columns on an 80-character display.
pathname	Specify one or more directories or file specifications to display.

DIR always sorts directories before files. To display matching filenames in a single directory listing, append filenames with a semicolon. Place options before filenames.

DIRS

Display the current directory stack.

```
DIRS
```

DIRS displays the directory stack used by PUSHD and POPD with the most recent entries first. The directory stack holds up to 255 characters (about 10 to 20 entries).

DRAWBOX

Draw a box on the screen.

```
DRAWBOX ulrow ulcol lrrow lrcol style
  [BRIGHT] [BLINK] fg ON bg [FILL bgfill]
  [SHADOW]
```

ulrow	Number of the upper-left row.
ulcol	Number of the upper-left column.
lrrow	Number of the lower-right row.
lrcol	Number of the lower-right column.
style	Use the number for the box style you want:

0	Borderless
1	Single line
2	Double line
3	Single line on top and bottom, double on sides

4	Double line on top and bottom, single on sides
BRIGHT	Display the selected color with high intensity.
BLINK	Make the box blink on the screen.
fg	Foreground color (see the color list below).
ON	Command separating the foreground and background colors.
bg	Background color (see the color list below).
FILL	Command to fill the box background with a specified color.
bgfill	Background fill color (for the inside of the box; see the color list below).

Black	Blue	Green	Red
Magenta	Cyan	Yellow	White

SHADOW	Include a transparent drop shadow.

Rows and columns start at zero. On a standard 25 row by 80 column display, valid rows are 0 to 24 and valid columns are 0 to 79.

DRAWHLINE

Draw a horizontal line on the screen.

```
DRAWHLINE row column length style [BRIGHT]
  [BLINK] fg ON bg
```

row	Number of the row to start line.
column	Number of the column to start line.
length	Number of characters for the length of the line.

style	Use the number for the line style you want: 1 Single line 2 Double line
BRIGHT	Display the selected color with high intensity.
BLINK	Make the line blink.
fg	Foreground color (see the color list below).
ON	Command separating the foreground and background colors.
bg	Background color (see the color list below). Black Blue Green Red Magenta Cyan Yellow White

Rows and columns start at zero. On a standard 25 row by 80 column display, valid rows are 0 to 24 and valid columns are 0 to 79.

DRAWVLINE

Draw a vertical line on the screen.

```
DRAWVLINE row column length style [BRIGHT]
  [BLINK] fg ON bg
```

row	Number of the row to start the line.
column	Number of the column to start the line.
length	Number of characters for the length of the line.
style	Use the number for the line style you want: 1 Single line 2 Double line
BRIGHT	Display the selected color with high intensity.

BLINK	Make the line blink.
fg	Foreground color (see the color list below).
ON	Command separating the foreground and background colors.
bg	Background color (see the color list below).

Black	Blue	Green	Red
Magenta	Cyan	Yellow	White

Rows and columns start at zero. On a standard 25 row by 80 column display, valid rows are 0 to 24 and valid columns are 0 to 79.

ECHO

Enable or disable batch file or command line echoing, or display a message.

```
ECHO [ON | OFF | message]
```

ON	Turn echoing on (the default).
OFF	Turn echoing off.
message	Characters to output.

ECHO with no parameter displays the current echo status (ON or OFF).

ECHOS

Display a message without a trailing carriage return and line feed.

```
ECHOS message
```

message	Characters to output.

ENDLOCAL

Restore disk drive, directory, environment variables, and aliases saved in memory with SETLOCAL.

```
ENDLOCAL
```

Use SETLOCAL and ENDLOCAL only in batch files, not in aliases.

ERASE

See DEL.

ESET

Edit environment variables and aliases using NDOS line editing commands.

```
ESET [/A] [/M] varname
```

/A	Assume the varname is an alias so that you can edit an alias having the same name as an environment variable.
/M	Edit an environment variable in the master environment rather than the local environment.
varname	Environment variable or alias name.

EXCEPT

Perform a command, except on the files specified in parentheses.

```
EXCEPT (pathname) command
```

pathname	The file, wildcard set of files, or list of files that you want to exclude.
command	An NDOS internal command or alias, an external command, or a batch file.

EXCEPT prevents operations on the specified files by setting the hidden attribute, performing the command, and then clearing

the hidden attribute. EXCEPT does not work with programs or commands that ignore the hidden attribute, which includes DEL or ERASE with the /Z switch.

EXIT

Return from a secondary command processor (an application from where you temporarily exited to the DOS prompt).

```
EXIT [n]
```

n	The errorlevel value to return to the calling command processor.

FOR

Repeat a command for several variables.

```
FOR [/A[[:][-]rhsda]] %variable IN (set) [DO]
  command
```

/A	Retrieve only those files with some specified combination of attributes.
:	Optional colon.
-	Exclude the files with the subsequent attributes.
	Choose from the following attribute set:
	r Read-only file
	h Hidden file
	s System file
	d Subdirectory
	a Archive file
variable	A variable name that is up to 80 characters long and preceded by a % sign. (MS-DOS permits only a single character.)
IN	A word to introduce a subsequent list of files or text.

set	Specify a list of pathnames (which can include wildcards) or text strings enclosed within parentheses.
DO	An optional word to introduce the subsequent command.
command	An NDOS internal command or alias, an external command, or a batch file.

Unlike COMMAND.COM, either a single % or a double %% for the variable works both from the command line and in batch files. Also, "DO" is optional in NDOS.

FREE

Display the total disk space, total bytes used, and total bytes free on the default or specified drives.

```
FREE [drive1:] [drive2:] [...]
```

drive:	The drive for which you want to see disk usage.

If you do not specify a drive, FREE displays information on the default drive.

GLOBAL

Execute a command in the current directory and its subdirectories.

```
GLOBAL [/H] [/I] [/P] [/Q] command
```

/H	Look for hidden directories.
/I	Ignore non-zero exit codes and continue.
/P	Prompt for execution of the command in each directory.
/Q	Use quiet mode so directory names don't display during execution.
command	An NDOS internal command or alias, an external command, or a batch file.

GOSUB

Use GOSUB (while in a batch file) to execute a subroutine at the location of the label.

```
GOSUB label
```

label	The batch file line label.

In a batch file, precede the label with a colon (:) and place it on a line by itself. GOSUB ignores the letter case. Also, end the subroutine with a RETURN statement.

GOTO

Continue batch file processing at the line following the label.

```
GOTO [/I] label
```

/I	Prevent GOTO from canceling IFF statements.
label	The batch file line label.

In a batch file, precede the label with a colon (:) and place it on a line by itself. GOTO ignores the letter case.

HELP

Display help for NDOS and DOS commands.

```
HELP [/M] [topic]
```

/M	Force Help to use a monochrome display mode.
topic	Internal or external command name or topic.

HELP without a topic displays a menu of commands and topics. You can also access the Help menu by pressing the F1 function key. To access HELP, you must have NHELP.EXE and NDOS.HLP in the current directory or a directory specified in your PATH statement.

You can specify the display mode for HELP by changing to your NDOS directory and typing `HELPCFG` at the DOS prompt.

HISTORY

Display, clear, or read the history list.

```
HISTORY [/A] [/F] [/P] [/R pathname]
```

/A	Add a command to the history list.
/F	Clear the command history list.
/P	Pause the display after each screen and wait for a keystroke.
/R	Read and append the command history list from the file in pathname.
pathname	Name of the command history list file.

HISTORY with no parameters displays the current history list. You can save the history list by redirecting the output of HISTORY to a file.

IF

Execute commands on specified conditions.

```
IF [NOT] condition1 [.AND. | .OR. | .XOR.
  [NOT] condition2 [...]] command
```

NOT	Execute the command only when the condition is false.
condition	A test to determine if the command should be executed. You can use any of the following conditional tests:

```
"string1" operator "string2"
```

Compare two strings (ignore letter case). When comparing strings, enclose the strings in double quotation marks. If both arguments begin with digits, it is a numeric comparison and "operator" is a relational operator (==, EQ, NE, LT, LE, GE, or GT). In numeric comparisons, do not use quotation marks unless you want to compare string values.

`ERRORLEVEL [condition] number`

Exit code of the preceding external program (default is GE).

`EXIST pathname`

True if the file exists.

`ISALIAS aliasname`

True if the specified name is an alias.

`ISDIR [drive:]path`

True if the subdirectory exists.

`ISINTERNAL command`

True if the specified command is an active, internal NDOS command.

`ISLABEL labelname`

True if the specified label exists.

.AND., .OR.,.XOR. Link conditions with these logical operators.

command Execute an NDOS internal command or alias, an external command, or a batch file only when the condition is true; otherwise ignore the command.

See the readme file NDOS.DOC on variable functions and environment variables for additional tests that you can perform.

IFF

Execute commands on IF/THEN/ELSE conditions.

```
IFF [NOT] condition1 [.AND. | .OR. | .XOR.
  [NOT] condition2 [...]] THEN ^command1^
  ELSE [[IFF [NOT]] condition3 THEN]
  ^command2^ ENDIFF
```

NOT Execute the command only when the condition is false.

condition A true/false test to determine if the commands should be executed. See the IF command for a list of the available tests.

.AND., .OR.,.XOR.	Link conditions with these logical expressions.
^command^	An NDOS internal command or alias, an external command, or a batch file. Enclose commands in the up-arrow symbols.
THEN	Execute the following command if the previous condition was true.
ELSE	Execute the following command if the previous condition was false.
ENDIFF	Ending delimiter of this IFF statement.

You can nest IFF statements up to 15 levels deep.

INKEY

INKEY optionally displays a prompt for user input. Then it waits for a specified time for a single keystroke from the user and stores it in an environment variable.

```
INKEY [/K"..." /Wn] [text] %%varname
```

/K	The allowable keystrokes, which you must enclose in double quotation marks. To read a control or function key as part of the keystrokes, enclose them in square brackets.
/Wn	The waiting period, where *n* is the number of seconds to wait for a keystroke. If INKEY receives no keystroke by the end of the timeout period, it returns with the variable unchanged.
text	Prompt text to display.
varname	An environment variable.

An ASCII character has a value from 1 to 255. Extended characters such as function keys and cursor keys are stored as a string in decimal format, with a leading @ (for example, the F1 key is @59).

INPUT

Get text from the keyboard and save it in an environment variable.

```
INPUT [/Wn] [text] %%varname
```

/Wn	The waiting period, where *n* is the number of seconds to wait for a keystroke. If INPUT receives no keystroke by the end of the timeout period, it returns with the variable unchanged.
text	Prompt text to display.
varname	Environment variable.

INPUT stores in the variable all characters entered up to, but not including, the carriage return.

KEYSTACK

Automatically feed keystrokes to a program from a batch file or alias.

```
KEYSTACK ["string"] [key] [n] [@n] [!] [/Wn]
```

"string"	Enter characters in double quotation marks ("abc") to store them as is in the keyboard buffer.
key	The name of a key. Do not surround this keyname with quotation marks. (Example syntax: KEYSTACK F1.)
n	Use numbers not enclosed in quotation marks for ASCII decimal codes.
@n	Use numbers preceded by @ for extended keyboard codes generated by the Alt key, cursor pad keys, and the function keys.
!	Clear all pending keystrokes, both in the KEYSTACK buffer and in the keyboard buffer.
/Wn	The waiting period, where *n* is the number of seconds to wait for a keystroke.

When *n* equals 0, it is a special case used with programs that flush the keyboard buffer. It tells the program the buffer is clear, and accepts subsequent keystrokes normally.

KEYSTACK requires that the device driver KEYSTACK.SYS be loaded in your CONFIG.SYS file.

LH

See LOADHIGH.

LIST

Display a file with forward and backward paging and scrolling.

```
LIST [/H] [/S] [/W] pathname
```

/H	Strip the high bit from each character before displaying.
/S	Read from the standard input (keyboard) rather than a file. This allows you to pipe command output and view it with LIST.
/W	Wrap text lines wider than a screen to the next line.
pathname	The file to display.

LIST uses the cursor pad to scroll through the file.

LOADBTM

Switch a batch file (.BAT or .BTM) to or from BTM mode.

```
LOADBTM [ON | OFF]
```

If you don't specify on or off, LOADBTM displays its status. You can only use LOADBTM from within batch files. See the readme file NDOS.DOC on batch and batch-to-memory files.

LOADHIGH or LH

Load a program in high memory.

```
LOADHIGH | LH pathname [parameters]

LOADHIGH [/L:region1[,minsize1]
  [;region2[,minsize2]] [...] [/S]] pathname
  [parameters]
```

/L:region1[,minsize1] [;region2[,minsize2]]...

Specifies the regions of memory to load the program. Region1 specifies the number of the first memory region; minsize1 specifies the (optional) minimum size. Region2 and minsize2 specify the (optional) second region. You can specify as many regions as you want.

/S — Shrinks a UMB to its minimum size while the program is loading. MemMaker primarily uses /S.

pathname — The program that you want to load into memory.

parameters — Any command line parameters for the loaded program.

This command only works on 80286 or above systems that have memory management software that can map memory into the 640K to 1024K area. To use LOADHIGH, you must put the line DOS 5.x DOS=UMB in your CONFIG.SYS file.

LOG

Save a log of commands to a file.

```
LOG [/W pathname] [ON | OFF | text]
```

/W pathname — Turn on command logging and specify a new name for the log file. The default is C:\NDOS.LOG in the boot drive.

ON — Add command lines to the log file. LOG stores commands in the log file as they were entered, before performing any alias or variable expansion.

OFF	Do not add command lines to the log file.
text	Text line to add to the log file (even if LOG is OFF).

LOG with no parameters displays the log status (ON or OFF).

MD

See MKDIR.

MEMORY

Display the system RAM status.

```
MEMORY
```

MEMORY displays the total and free RAM, the total and free expanded memory, the total extended memory and free XMS memory (on an 80286 or 80386 computer), the total and free environment space, the total and free alias list space, and the total command history space.

MKDIR or MD

Create subdirectories.

```
MKDIR | MD directory
```

directory	Directory to create. This name can include the full pathname if it is in another directory or drive.

MOVE

Move files to other directories and drives.

```
MOVE [/C] [/D] [/H] [/N] [/P] [/Q] [/R] [/S]
  [/U] source1 [source2] [...] target
```

/C	Move a changed file to its destination only if the destination file exists and is older.
/D	Require the destination to be a directory.
/H	Move all files, including hidden and system files.

/N	Do virtually nothing. Perform all actions but the final move.
/P	Prompts you to confirm each file move.
/Q	Quiet mode turns off the display during the file move.
/R	Prompts you to confirm replacing an existing file.
/S	Move an entire subdirectory tree to a new location.
/U	Move an updated file to its destination only if the destination file exists and is older.
source	Pathname of the files to move.
target	Pathname of the destination for the files.

The MOVE command moves the specified files to the last filename specified, called the target. If the target already exists, it is deleted when the file is moved.

If you move more than one source file in the command, your target must be a directory.

PATH

Tells NDOS where to search for executable and batch files not in the current directory.

```
PATH [;]

PATH pathname1[;[pathname2]]
```

Typing PATH with no parameters displays the current search path. Typing PATH with just a semicolon clears the search path. Each path statement must be separated with a semicolon.

PAUSE

Suspend alias or batch file execution and wait for a keystroke.

```
PAUSE [message]
```

message	Text to display instead of the default "Strike a key when ready."

POPD

Change to the disk drive and directory at the top of the directory stack, which was saved with PUSHD (starting with the most recent).

```
POPD [*]
```

*	Clear the directory stack without changing the current drive and directory.

PROMPT

Change the NDOS command-line prompt.

```
PROMPT [text]
```

text	Literal text and special strings of the form $?, where ? is one of the following characters:

b	The pipe character |.
c	The open parenthesis (.
d	Current date, in the format Tue Dec 8, 1992.
e	The ASCII ESC character (decimal 27).
f	The closed parenthesis).
g	The > character.
h	Backspace over the previous character.
l	The < character.
n	Default drive letter.
P	Current disk and directory (uppercase).
p	Current disk and directory (lowercase).
q	The = character.
s	The space character.

t	Current time, in the format hh:mm:ss.
v	DOS version number, such as 5.00.
Xd:	Current disk and directory (uppercase) where "d" is the drive specification.
xd:	Current disk and directory (lowercase) where "d" is the drive specification.
z	Display the current NDOS shell nesting level (you must be running NDOS as the primary shell in swapping mode). The primary command processor is 0. Resident copies of NDOS return a 99 for the shell nesting level.
$	The $ character.
_	CR/LF (go to beginning of new line).

PROMPT with no arguments sets the prompt on drives A: and B: to ng, and on all other drives to pg (display current disk and directory).

You cannot use PROMPT to send ANSI escape sequences from within batch files. Unlike COMMAND.COM, NDOS does not display a prompt within batch files. You can use ECHO instead, substituting Ctrl+X followed by an "e" where you would use "$e" in the prompt string. For more information on escape characters, see the readme file NDOS.DOC.

PUSHD

Save the current disk drive and directory.

```
PUSHD [[drive:]path]
```

PUSHD saves the current disk and directory on the directory stack. If you specify a pathname on the command line, PUSHD changes the disk drive and directory.

QUIT

Terminate the current batch file.

```
QUIT [n]
```

n	The errorlevel value to return to the calling command processor.

When quitting a batch file called from another batch file, processing resumes in the previous file at the line following the original call. To end all batch file processing, use CANCEL.

RD

See RMDIR.

REBOOT

Perform a system reboot (startup).

```
REBOOT [/C] [/V]
```

/C	"Cold" reboot. This action has nearly the same effect as turning the computer off and on again. Use this switch to more thoroughly initialize the computer.
/V	Verify the reboot request by prompting for confirmation.

REBOOT without any switches is comparable to pressing the Ctrl+Alt+Delete keys, which is a "warm" boot.

REM

Place a comment in a batch file.

```
REM [comment]
```

comment	Descriptive text in a batch file.

If ECHO is on, NDOS will echo the comment to the display during the batch file's execution.

REN or RENAME

Rename files or subdirectories.

```
RENAME | REN [/N] [/P] [/S] [/Q] source1
  source2 [...] [target]
```

/N	Do virtually nothing. Perform all actions but the final renaming.
/P	Prompt before renaming each file.
/S	Use to rename subdirectories.
/Q	Use quiet mode so files do not display during renaming.
source	Files or subdirectories to be renamed.
target	New name of files or subdirectories.

You can use the wildcard characters * and ? in the filenames. REN also renames subdirectories. NDOS allows you to optionally select the target path, renaming the source file to a new directory on the same disk.

RETURN

Return processing from a GOSUB (subroutine) call in a batch file to the command following the original GOSUB.

```
RETURN
```

RMDIR or RD

Remove one or more subdirectories.

```
RMDIR | RD pathname
```

You can use the wildcard characters * and ? in the directory names.

SCREEN

Position the cursor on the screen, and optionally display a message.

```
SCREEN row column [text]
```

row	Number of the starting row.
column	Number of the starting column.
text	Display text at the new cursor location.

Rows and columns start at zero. On a standard 25 row by 80 column display, valid rows are 0 to 24 and valid columns are 0 to 79. SCREEN does not change the screen colors. If you have ANSI.SYS installed and have set colors with CLS or COLOR, the display shows the specified colors.

SCRPUT

Position the cursor on the screen and display a message in color.

```
SCRPUT row column [BRIGHT] [BLINK] fg ON bg
  text
```

row	Number of the starting row.
column	Number of the starting column.
BRIGHT	Display the selected color with high intensity.
BLINK	Blink the message.
fg	Foreground character color (see the color list below).
on	Command separating the foreground and backgroud colors.
bg	Background character color (see the color list below).

Black	Blue	Green	Red
Magenta	Cyan	Yellow	White

text	The text to display.

Rows and columns start at zero. On a standard 25 row by 80 column display, valid rows are 0 to 24 and valid columns are 0 to 79.

SELECT

Execute a command on the specified files.

```
SELECT [/A[:]-rhsda] [/C] [/C[H]] [/D] [/E]
  [/O[:]-acdeinrsgu] command1 [command2]
  [...] (filespec1 [;] [filespec2] [...])
```

/A — Display filenames with specified attributes:

r	Read-only
h	Hidden
s	System
d	Directory
a	Archive
-	A minus sign before the attribute means "not."

/C — Display compression specifications for filenames, if applicable.

/C[H] — Display file compression ratio; /CH uses host allocation unit size.

/D — Disable filename coloring.

/E — Display filenames in uppercase.

/O — Select a sorting order:

a	Standard ASCII
c	Compression ration (lowest first)
d	Date and time
e	Extension
i	File description (see DESCRIBE)
n	Name
r	Reverse sort order for *all* keys
s	Size

	g	Group directories first
	u	Unsorted (same as COMMAND.COM)
	-	A minus sign before the sort key reverses that key's sort order.
command		An NDOS internal command or alias, an external command, or a batch file.
filespec		Selected files upon which to execute the specified command.

You can make command-line file selections by marking the directory entries using a full-screen "point-and-shoot" display. You can substitute the selected files for the file enclosed in parentheses, and execute the command for each marked file.

If you don't specify a command, the selected files become the command (they must be executable files). If you enclose the filenames in square brackets instead of parentheses, SELECT substitutes all the selected files on one command line.

SET

Display, create, modify, or delete environment variables.

```
SET [/M] [/P] [/R pathname]
  [variable[=[value]]]
```

/M	Display or modify the master environment rather than the local copy.
/P	Pause display after each full screen and wait for a keystroke.
/R	Read and load environment variables from a file.
pathname	The name of a file containing variable definitions.
variable	Environment variable name (up to 80 characters).
[=]value	The new value for the variable (up to 255 characters). Note that spaces count as part

of a variable name. Hence, SET XX=NU is different from SET XX = NU.

SET with no variable and value displays the environment. SET with just a variable and no value removes the variable from the environment.

SETDOS

Display or set NDOS configuration variables.

```
SETDOS [/An] [/Cx] [/Ex] [/Fn] [/Hn] [/I +|-
  c] [/Ln] [/Mn] [/Nn] [/Rn] [/So:i] [/Un]
  [/Vn]
```

n	A number variable.
x	A character variable.
o	A numeric value representing the size of the cursor in overstrike mode (percentage of the character cell).
i	A numeric value representing the size of cursor in insert mode (percentage of the character cell).
c	Internal NDOS command.
/An	Use to set the ANSI driver indicator. A 0 allows NDOS to determine whether an ANSI driver is installed. A 1 forces NDOS to assume an ANSI driver is installed. A 2 forces NDOS to assume an ANSI drive is not installed. (Default is 0.)
/Cx	Assign the compound character to be used for separating multiple commands on the same line. (Default is ^.)
/Ex	Assign the escape character. This is the character used to suppress the normal meaning of a following character. (Default is Ctrl+X.)
/Fn	Assign filename truncation. Use 1 for full names. (Default is 0).

/Hn	History of the minimum command size to save. 256 disables history saves, while 0 (the default) saves everything.
/I+|-	Enable or disable the specified, internal NDOS command.
/Ln	Control how NDOS gets its input from the command line. A 0 is character input. A 1 is the NDOS INT 21 0Ah "Get Line" call (like COMMAND.COM). (Default is 0.)
/Mn	Control the line-editing mode. The default (0) is overstrike mode. Use 1 for insert mode.
/Nn	Control output redirection. If set to 1, the "no clobber" mode, existing files may not be destroyed by output redirection; when appending with >>, the output file must exist. (Default is 0.)
/Rn	Set the number of screen rows used by the video display. NDOS detects screen sizes unless yours is nonstandard.
/So:i	Set the NDOS cursor size.
/Un	Control case for displayed filenames. The default (0) is lowercase. A 1 is uppercase.
/Vn	Control command echoing for batch files. If 0, commands are not echoed unless ECHO is ON. If 1 (the default), batch file commands are echoed.

SETDOS with no parameters displays the current NDOS configuration settings.

SETLOCAL

Save a copy of the current disk drive, directory, environment variables, and aliases to memory.

```
SETLOCAL
```

Restore with ENDLOCAL.

SHIFT

Enable the use of more than 127 replaceable parameters in a batch file. Also, move each of the batch file replaceable parameters *n* positions to the left (to the right if *-n*).

```
SHIFT [n]
```

n	A percentage from 0 to 127.

SHIFT provides compatibility with COMMAND.COM, which supports only 10 parameters (%0 through %9). NDOS supports 128 parameters (%0 to %127).

SWAPPING

Display, enable, or disable the NDOS swapping state.

```
SWAPPING [ON | OFF]
```

ON	NDOS saves its transient portion before executing any external command. The default is ON.
OFF	Release memory of the transient portion of NDOS (about 88K).

SWAPPING with no parameters displays the swapping status.

TEE

Copy standard input (keyboard) to standard output (video display), and save a copy in the specified files.

```
TEE [/A] pathname
```

/A	Append output to the specified files rather than overwriting it.
pathname	File to store standard input.

You must finish standard keyboard input with Ctrl+Z.

TEXT/ENDTEXT

Display a block of text in a batch file.

```
TEXT ... ENDTEXT
```

TEXT displays subsequent lines in the batch file until terminated by ENDTEXT. You must enter both TEXT and ENDTEXT as the only command on that line.

TIME

Display or set the current system time.

```
TIME [hh:mm:ss[AM | PM]]
```

hh	A number for the hour (0 to 23).
mm	A number for the minutes (0 to 59).
ss	A number for the seconds (0 to 59).
AM	Use AM for 12-hour morning time format.
PM	Use PM for 12-hour evening time format.

TIME defaults to 24-hour format.

TIMER

Turn any of the three system stopwatches on or off.

```
TIMER [/1] [/2] [/3] [/S] [ON]
```

/1	Use timer number 1. The default timer.

/2	Use timer number 2.
/3	Use timer number 3.
/S	Display elapsed time without stopping the timer (split time).
ON	Force the stopwatch to restart.

With three timers available, you can run multiple overlapping events.

TRUENAME

Find and display the full, true path and filename for a file.

```
TRUENAME filename
```

filename	The file whose true name you want to know.

TYPE

Display the contents of the specified files.

```
TYPE [/L] [/P] pathname1 [pathname2] [...]
```

/L	Precede each line of text with line numbers.
/P	Pause display after each full screen and wait for a keystroke.
pathname	The name of the files to display.

NDOS displays multiple files when you use the wildcards * and ? in the pathname.

UNALIAS

Remove aliases from the alias list.

```
UNALIAS alias1 [alias2] [...]
UNALIAS *
```

alias	Name of alias.
*	Delete all aliases.

UNSET

Remove variables from the environment.

```
UNSET [/M] varname1 [varname2] [...]
UNSET *
```

/M	Remove the variable from the master environment rather than the local environment. Only use this switch within a secondary command processor (when you have temporarily exited out of an application).
varname	Name of environment variable.
*	Delete all environment variables.

VER

Display the current NDOS and DOS versions.

```
VER [/R]
```

/R	Additionally displays the location of the DOS kernal (DOS 5.0 only).

VERIFY

Display, enable, or disable disk write verification. Use to check that each written sector of a file is readable.

```
VERIFY [ON | OFF]
```

ON	Enable write verification.
OFF	Disable write verification (the default).

VERIFY with no parameters displays the current VERIFY state. When on, VERIFY remains on until you set it off.

VOL

Display the disk volume labels.

```
VOL [drive1:] [drive2:] [...]
```

drive	The drive whose label you want to see.

VOL with no parameters displays the volume label of the default drive. On DOS 4.0 and higher, only the serial number displays.

VSCRPUT

Display text vertically in the specified color.

```
VSCRPUT row column [BRIGHT] [BLINK] fg ON bg
  text
```

row	Number of the starting row (0 to 24).
column	Number of the starting column (0 to 79).
BRIGHT	Display the selected color with high intensity.
BLINK	Make the screen blink.
fg	Foreground color (see the color list below).
ON	Command separating the foreground and background colors.
bg	Background color (see the color list below).

Black	Blue	Green	Red
Magenta	Cyan	Yellow	White

text	The text to display.

Rows and columns start at zero on a standard 25 row by 80 column display.

Y

Copy standard input to standard output, and then copy the specified files to standard output.

```
Y pathname1 [pathname2] [...]
```

End standard input from the keyboard by pressing Ctrl+Z.

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Personal System Information

Symantec Software:

Product Name _____

Version _____

Serial Number (if applicable) _____

Hardware:

Computer _____

Model _____

RAM (random-access memory, in MB) _____

Operating System Software:

❒ MS-DOS Version _____

❒ Windows Version _____

❒ Macintosh System Version _____

Miscellaneous:

Include manufacturer name, product name, and model number for hardware, if known

Hard Disk _____

Capacity (in MB) _____

Type: ❒ SCSI ❒ ESDI ❒ RLL ❒ MFM

❒ IDE ❒ Other _____

Video Board/Monitor _____

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Modem _____ Speed (in baud) _____

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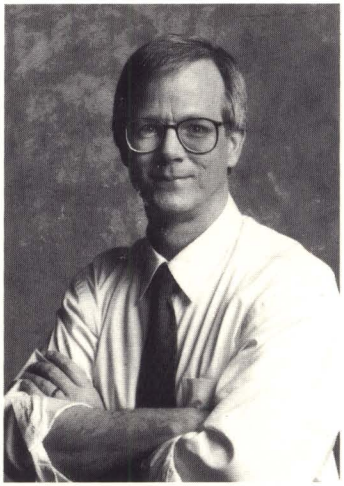
Notes

Notes

Notes



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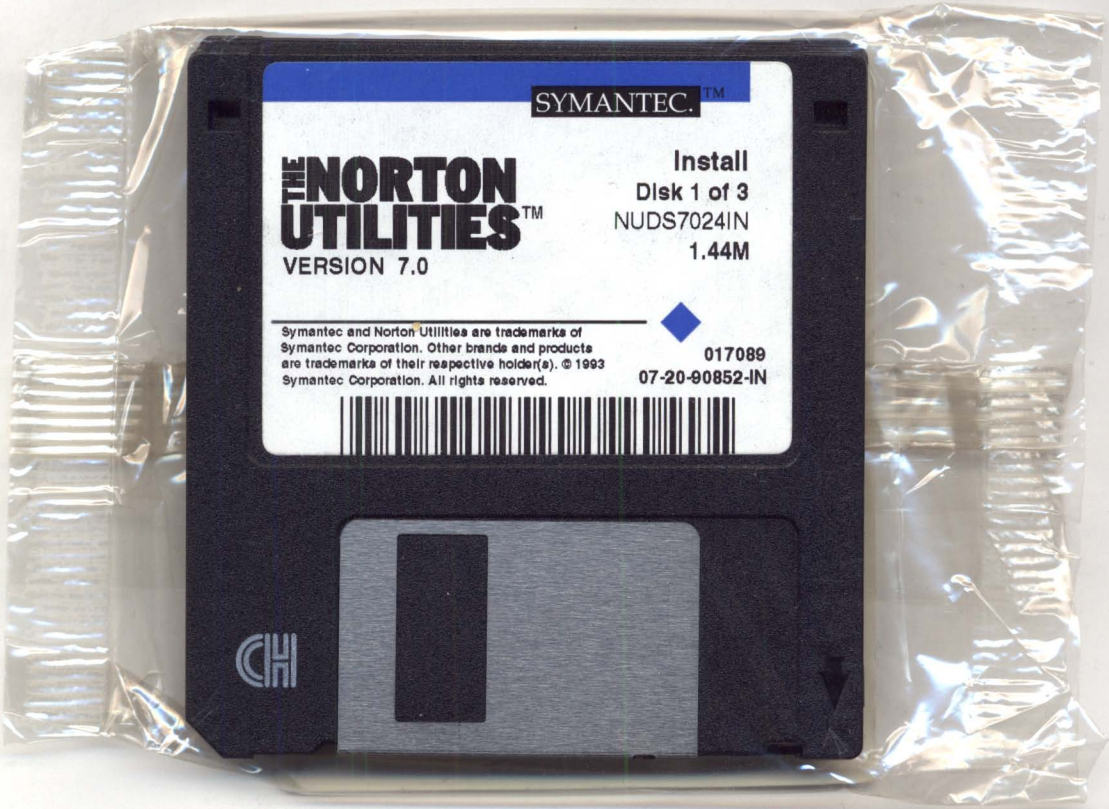
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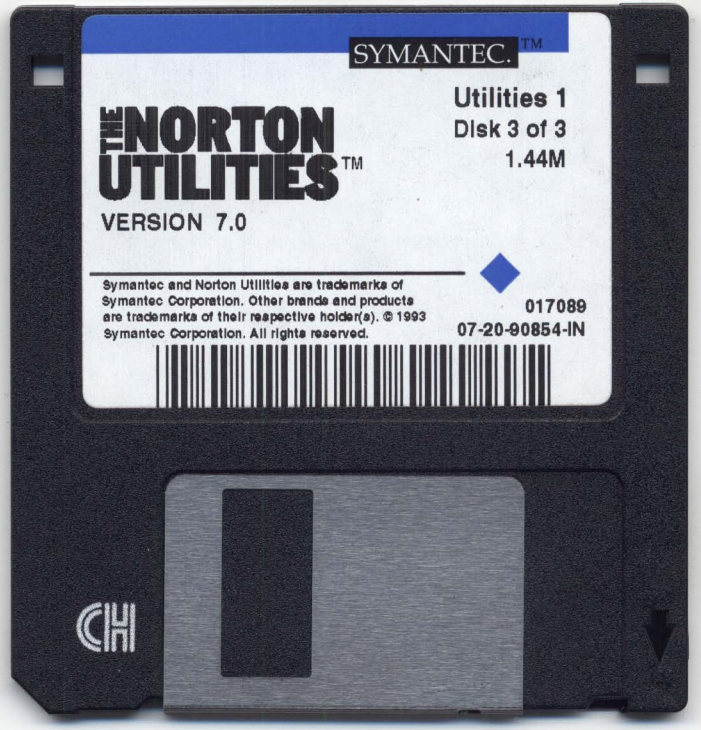
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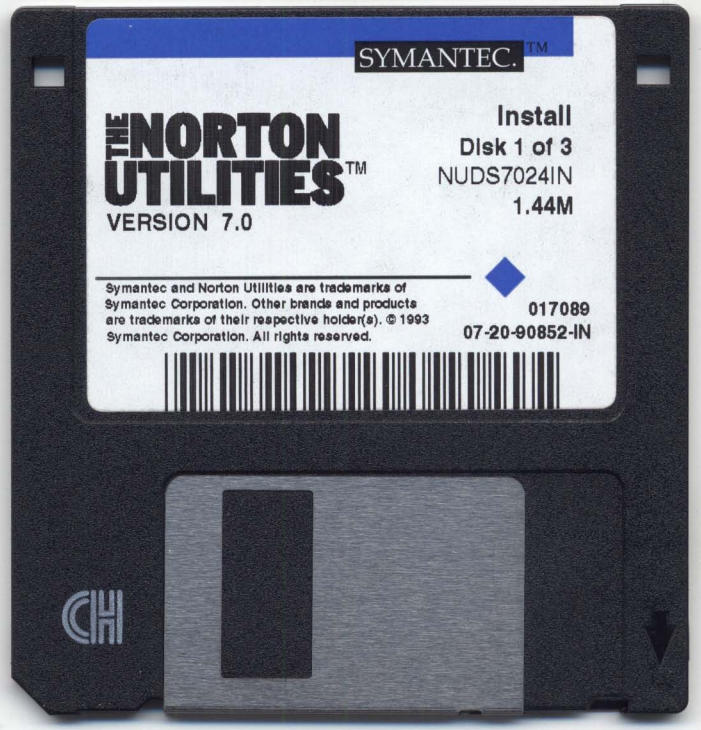
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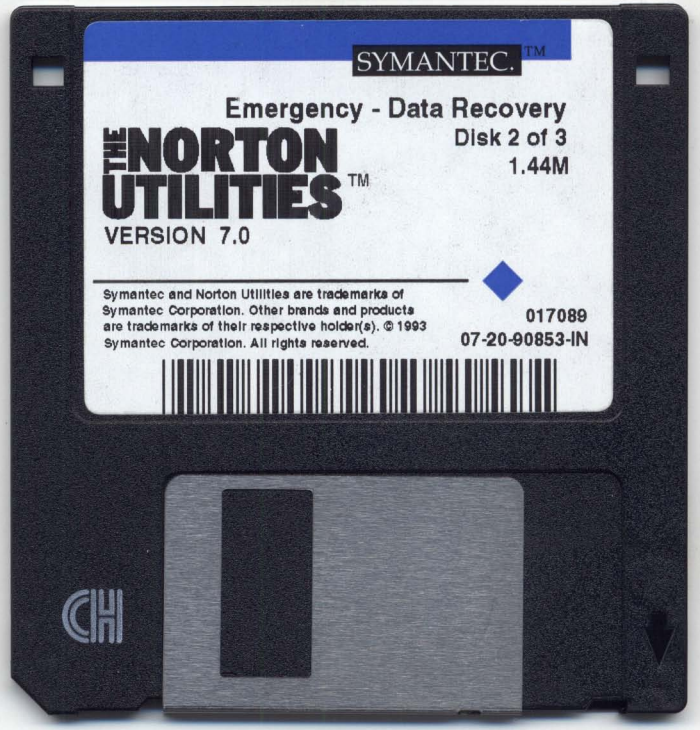
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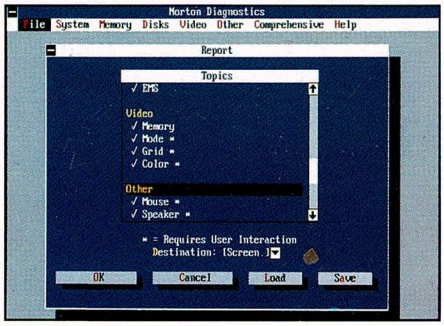
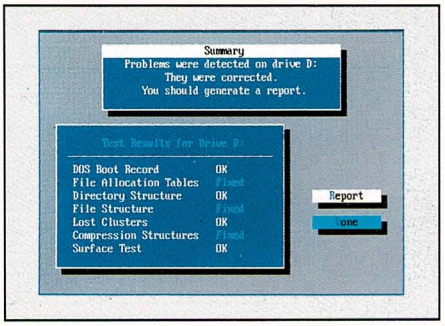
The Norton Utilities® version 7.0 provides everything you need to keep your entire computer system running as it should. Enjoy increased system speed, productivity and the peace of mind of owning the award-winning standard for data recovery, protection, and system diagnostics.



NEW! Norton Diagnostics analyzes your system to report hardware failures and provide peace-of-mind and protection from unexpected or intermittent lock-ups.



Norton Disk Doctor diagnoses and repairs system and data integrity errors on virtually any size drive.

Recover Valuable Data and Prevent Data Loss

The Norton Utilities is legendary for its data recovery and protection capabilities.

Now, Norton Utilities supports diagnostics and repair of DOS 6.0 DoubleSpace, Stacker, SuperStor, and SuperStor Pro compressed drives.

- The Norton Disk Doctor – Automatically repairs more disk problems than any other product.
- Advanced Disk Editor – The most powerful and flexible disk exploration and repair tool. Now includes a unique Advanced Recovery Mode.
- UnErase – The most powerful and thorough file recovery program available.
- File Fix – Improved to repair additional data files, including Lotus 1-2-3, Excel, Quattro Pro, dBASE, and WordPerfect.
- Network File UnErase – Enables file recovery on network drives.
- UnFormat/Safe Format – Recovers data from an accidentally formatted hard or floppy disk.

Optimize Performance and Enhance Productivity

- Speed Disk™ – Quickly defragments virtually any size hard disk for improved file access times and data recovery including support for DOS 6.0 DoubleSpace, Stacker, SuperStor, and SuperStor Pro compressed drives.
- Norton Cache – The fastest, most compatible disk cache available. Windows-compatible.
- NDOS – Provides all essential DOS improvements while using less memory.
  - Adds over 200 command line options.
  - Allows file name descriptions up to 40 characters long for easier file location.
  - Command history, editing, and audit trail.
- Calibrate™ – Improves disk speed by adjusting hard drive interleaves.

Hardware Diagnostics – New!

A complete suite of tests to identify faulty and unstable components preventing unexpected or intermittent failures and potential data loss.

- System Board Tests.
- Serial and Parallel Port Tests – Internal and external registers.
- Memory Tests – Conventional, expanded, and extended.
- Disk Tests – Floppy and hard disk drives.
- Video Tests – RAM , Mode, and Color.
- Mouse, Speaker, and Keyboard tests. And more.

Additional Features

- DISKREET™ – Creates password-protected areas of your hard disk and automatically encrypts files in the background. Keyboard and screen lock protection as well.
- WipeInfo™ – Removes all evidence of confidential information from a disk.
- System Information – Comprehensive reporting of system configuration and status including XMS and EMS memory, TSR's, network information, CMOS status and PC performance.
- Enhanced Emergency Disk – Contains disaster recovery utilities that automatically load from crashed systems even when DOS has been damaged or deleted.
- Enhanced Rescue Disk – Automatically prepare rescue disks that contain DOS, startup files and vital drivers necessary for recovering from a crashed hard disk.
- File Find – Fast, powerful file locator.
- DupDisk – Convenient, one-pass diskette duplication.
- Includes other Norton Classic Utilities.

System Requirements

- DOS 3.3 or higher
- IBM PC AT, PS/2 or 100% compatibles
- 640K RAM (1 MB recommended)
- Hard disk with 6 MB free disk space

Support For

- Large hard disks up to 2 gigabytes
- DOS 6.0 DoubleSpace, Stacker, SuperStor, and SuperStor Pro compressed drives
- Microsoft Mouse or compatibles
- HP LaserJet and PostScript Printers
- Networks, with special features and enhancements for NetWare installations
- Windows 3.0 and 3.1

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